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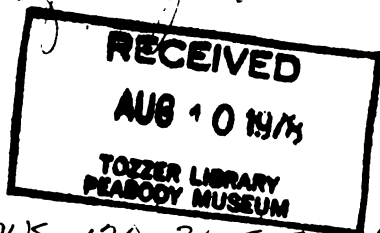
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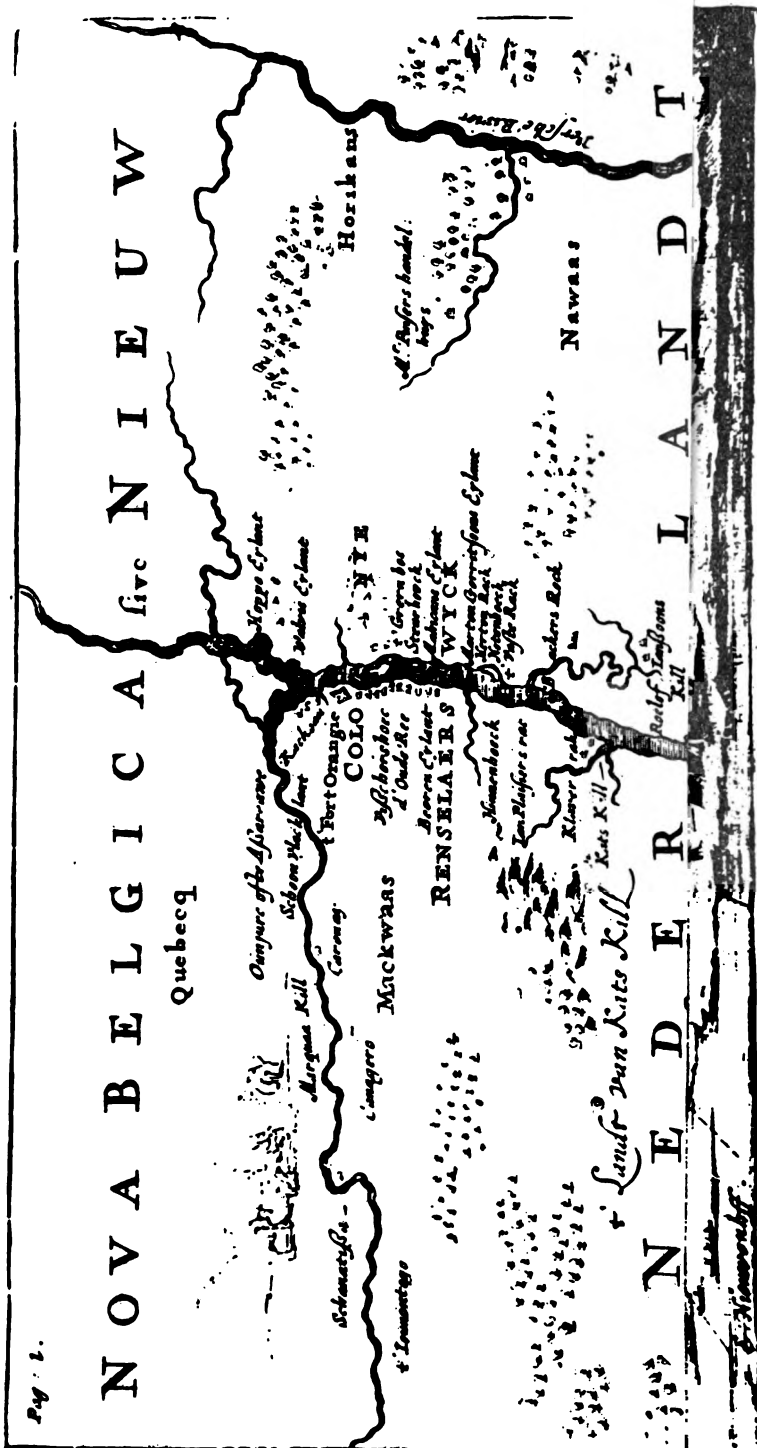
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THE VAN DER DONCK MAP, 1656

EXPLORATION OF A MUNSEE CEMETERY NEAR MONTAGUE, NEW JERSEY

BY

GEORGE G. HEYE AND GEORGE H. PEPPER

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INTRODUCTION

ON the banks of the Delaware river between Port Jervis, New York, and the Delaware Water Gap, there are many village sites and a few burial places. For years it has been known that this section offered a rich field for archeological study, but prior to the explorations herein described it remained practically neglected. The shores of the river, both in New Jersey and in Pennsylvania, afford broad reaches of arable land, and along this stretch of the stream are several flat islands. The New Jersey side especially furnished suitable level places for camps and for farming, and on these numerous evidences of aboriginal habitation are found.

Dr Edward S. Dalrymple, of Branchville, New Jersey, had done some work on this site twelve or fifteen years before, and after his death a collection made by him had come into the possession of the Museum of the American Indian.

In 1913 the writers made a reconnoissance of the Delaware valley between Dingman's Ferry and Port Jervis. The most promising site for archeological excavation was found on the farm of Burson W. Bell, Esq., near the town of Montague, in Sandyston township, Sussex county, New Jersey. The results of the exploration of this burial place form the report herein presented.

The work of the Museum of the American Indian was commenced at the close of April, 1914, and was continued until early in July, when, during the writer's absence, the arrest of his men, on the charge of violating a statute prohibiting the disturbance of human burials, was caused by a local politician who believed that by keeping strangers out of his district he would gain the favor of his constituents.

The judicial history of the case, which will be of interest to future investigators of American archeology, is as follows:

On July 2d, 1914, one John Van Sickle went before Justice of the Peace John E. Whitney of Newton, New Jersey, and made a complaint against George G. Heye that he "did remove the remains of deceased persons to deponent unknown from their graves and places of sepulture in the old Minisink Graveyard in said township (Sandyston) from mere wantonness," and thereupon a warrant was issued for Mr. Heye's arrest. Mr. Heye hearing that a warrant was out for his arrest, by an arrangement with the District Attorney of Sussex County, attended at Newton with his counsel on July 20th, 1914, submitted to arrest, waived indictment and had a trial on that date before the Sussex County Court of Special Sessions, and upon said trial was convicted and sentenced to pay a fine of \$100.

Mr. Heye carried his conviction on a Writ of Error to the Supreme Court of New Jersey and the case came up on appeal before the November term of said court, which reversed the conviction in an opinion a copy of which is annexed hereto.

NEW JERSEY SUPREME COURT.

NOV. TERM, 1914.

The State,

vs.

George G. Heye,

Error to the Sussex Special Sessions Court.

Argued before Gummere, Chief Justice, and Justices Garrison and Minturn.

For the plaintiff in error, Robert S. Hudspeth.

For the State, William A. Dolan, Prosecutor of the Pleas Per Curiam:

The defendant was tried and convicted under the 148th section of the Crimes Act, which makes it a high misdemeanor for any one to remove a body of any deceased person from his grave or tomb for the purpose of dissection, or for the purpose of selling the same, or from mere wantonness.

The facts show that the plaintiff in error was an anthropologist, who, while looking for Indian relics in Sandyston township, Sussex County, came across a burial place used by the Indians who inhabited that part of the state two or more centuries ago; that he removed two or three of the skeletons which he found there for the collection of the New York Anthropological Society; about the same number for the Museum of the University of Pennsylvania; and several more for the United States Government at Washington. He did this with the consent of the owner of the land upon which these remains were found. On these facts he was convicted.

It may be that in what plaintiff in error did he violated the laws of decency

and morality, but it does not seem to us that he brought himself within the purview of the 148th section of the Crimes Act.

He certainly did not remove these skeletons for the purpose of dissection; nor was it shown that he did it for the purpose of making sale of them. His conviction was rested upon the theory that his act was one of mere wantonness. We do not think this conclusion sound. He took them for a specific purpose; and a thing done for a specific purpose, whether that purpose be one which the public generally will approve or disapprove, cannot be said to have been done in mere wantonness.

We conclude the judgment under review should be reversed.

The writer wishes to acknowledge the generous coöperation and interest taken in this work by Mr Burson W. Bell, the owner of the property on which the cemetery was situated, and to Mr Randall D. Sayre, of Milford, Pike county, Pennsylvania, who added greatly to the collection by the gift of a fine jar found by him on Minisink island directly opposite the cemetery.

G. G. H.

HISTORICAL DATA

As the part of Sussex county under consideration was probably richer in natural resources than any similar area in the State of New Jersey, from the earliest days it has furnished material for historical accounts, and the archives of the state are replete with documents which record the troubles between the native tribes and, at a later period, the inroads of white settlers. The region which particularly concerns us here comprises the townships of Sandyston and Montague in the northwestern corner of Sussex county (fig. 1). James P. Snell, in his *History of Sussex and Warren Counties*, pp. 361-362, published in 1881, says:

The Minisink patent, of historic memory, embraced the valuable lands of Montague, lying along the banks of the Delaware, and their fertility and natural advantages early attracted to this favored locality the Dutch settlers from Esopus. The township was thus made memorable soil before the white man had cleared the forests in other portions of the county. From the easy fords at the Minisink, Indian trails diverged, —west to the Wyoming Valley, along the Susquehanna River; north, by short cut across the peninsula of Pike County, to the mouth of the Lackawaxen, on the Delaware; south, through Culver's Gap, to the ponds and

hunting-grounds of the Kittatinny valley; and northeast, via the Delaware, to the Machackemack River and corresponding valleys.

The most valuable portion of the famous "Minisink patent" lay within the boundaries of Montague. It embraced that fertile tract of land extending from the mouth of the "Machackemack" at Carpenter's Point,

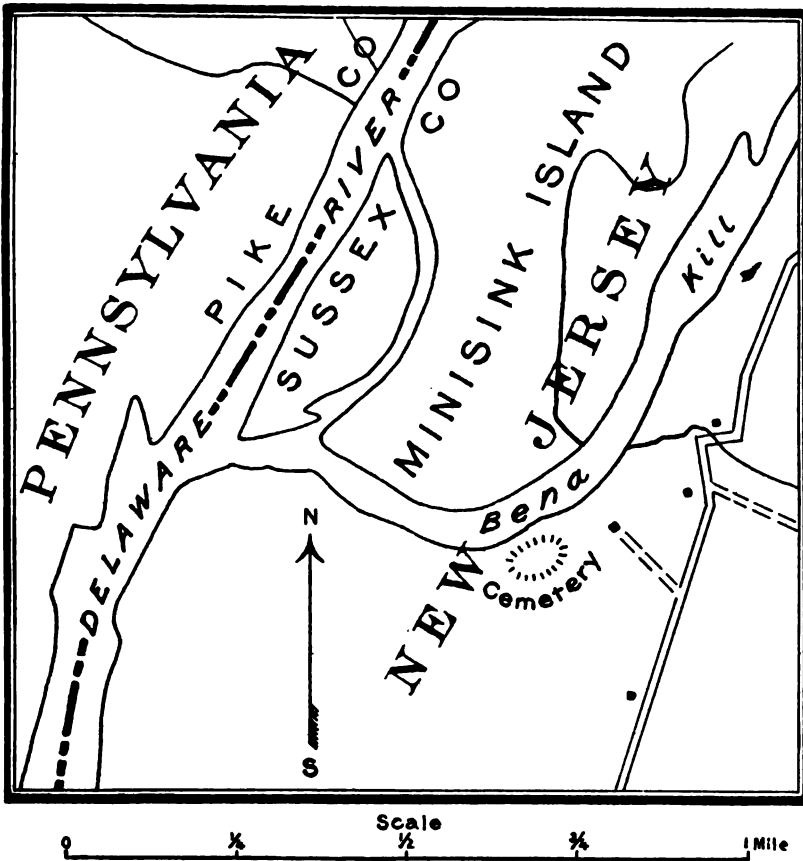


FIG. 1.—Map showing the location of the Minisink cemetery.

down the left bank of the Delaware River to the lower point of "Great Minisink Island." This patent covered the two largest and most fertile islands of the Delaware River, with the adjoining flats along the Jersey shore,—Mashipacong Island, lying between Carpenter's Point and the Brick House, and Minisink Island, lying below the Brick House. These

two islands alone contain 1000 acres of cultivated land, and, together with the shore flats and grazing-lands between the extremes named, more than 10,000 acres of the quality of land so highly prized by the Low-Dutch settlers was included in the Minisink patent. The settlement first made was located opposite the lower end of the Island (which gave name to the patent referred to), upon the higher portion of Minisink flats, just at the foot of the ridge on the south running parallel with the river. This settlement took the name of Minisink. A small grist-mill was erected upon the stream which here discharges its waters into the Bena Kill, between the residences of Daniel D. Everitt and Jacob Westbrook, Esq., the former residence being within the township of Montague and the latter in that of Sandyston, as this stream here forms the boundary line between these townships for a short distance from the river. Johannes Westbrook settled upon one side of this small stream of water, and Daniel Westfall (said to have been his son-in-law) upon the opposite bank, where Mr. Everitt now resides. The Westbrook family was early represented by three brothers, who located at Minisink soon after 1700.

The precise period at which the Dutch and Huguenot settlers entered the Minisink valley is uncertain. We have positive documentary evidence that there was a considerable colony of settlers at the Neversink and in the Minisink valley, including both of the Minisink Islands, prior to the beginning of the eighteenth century. A voting precinct, with a municipal organization, was laid off there before this date, which implies a considerable number of voters; and by an act of the Provincial Assembly of New York, passed Oct. 18, 1701, "for the more Regular proceedings in the Election of Representatives," the "inhabitants of Wagachemick (Neversink) and Great and Little Minisink (Islands)" were "empowered to give their votes in the County of Ulster." The evidence clearly substantiates the fact that there were many settlers in the Jersey Minisink previous to 1700.

The Indians which occupied this area were the Munsee, with possibly a few Unami, both divisions of the Delawares. According to the *Handbook of American Indians*¹—

The Munsee [whose name, according to Hewitt, is derived from *Min-asin-ink*, 'at the place where stones are gathered'] originally occupied the headwaters of Delaware river in New York, New Jersey, and Pennsylvania, extending south to Lehigh river, and also held the west bank

¹ *Bulletin 30, Bureau of American Ethnology*, pt. 1, Washington, 1907.

of the Hudson from the Catskill mountains nearly to the New Jersey line. They had the Mahican and Wappinger on the north and east, and the Delawares on the south and southeast, and were regarded as the protecting barrier between the latter tribe and the Iroquois.

Their council village was Minisink, probably in Sussex county, New Jersey. . . . The Minisink formed the principal division of the Munsee, and the two names have often been confounded. . . . By a fraudulent treaty, known as the 'Walking Purchase,' the main body of the Munsee was forced to remove from the Delaware about the year 1740, and settled at Wyalusing on the Susquehanna on lands assigned them by the Iroquois. Soon after this they removed to Alleghany river, Pennsylvania, where some of them had settled as early as 1724.

About 1720 the Iroquois assumed dominion over them, forbidding them to make war or sales of lands, a condition which lasted until about the opening of the French and Indian war. Many of them had originally removed from the west bank of Delaware river to escape the inroads of the Conestoga.

E. M. Ruttenber,¹ writing of the Minisink, says:

West of the Esopus country, and inhabiting the Delaware and its tributaries, were the *Minsis* proper of whom a clan more generally known as the *Minnisinks* held the south-western parts of the present counties of Orange and Ulster, and north-western New Jersey. Van der Donck describes their district as "Minnessinck of 'tLandt van Bacham," and gives them three villages: Schepinaikonck, Meochkonck, and Macharienkonck,² the latter in the bend of the Delaware opposite Port Jervis, and preserved perhaps in the name Mahackemeck. On Sauthier's map, Minnisink, the capital of the clan, is located some ten miles south of Mahackemeck, in New Jersey. Very little is known of the history of the clan as distinguished from the tribe of which they were part, although the authorities of New York had communication with them, and the missionary, Brainerd, visited them. Tradition gives to them the honor of holding the capital of the tribe in years anterior to the advent of the Europeans.

In a later work³ Ruttenber describes the town and the tribe as follows:

¹ *History of the Indian Tribes of Hudson's River*, Albany, 1872, p. 96.

² On the original map of Van der Donck (see our pl. 1) these names are spelled Meochkonck, Mecharienkonck, and t'Schepinaikonck, respectively.

³ *Footprints of the Red Men. Indian Geographical Names in the Valley of the Hudson River*, 1906, pp. 220-222.

Minisink, now so written and preserved as the name of a town in Orange County, appears, primarily, in 1656, on Van der Donck's map, "Minnessinck ofte t'Landt van Bacham", which may be read, constructively, "Indians inhabiting the back or upper lands," or the highlands. Heckewelder wrote: "The *Minsi*, which we have corrupted to *Monsey*, extended their settlements from the Minisink, a place named after them, where they had their council seat and fire," and Reichel added, "The Minisinks, *i. e.*, the habitation of the Monseys or Minsis." The application was both general and specific to the district of country occupied by the Minsi tribe and to the place where its council fire was held. The former embraced the mountainous country of the Delaware River above the Forks or junction of the Lehigh Branch; the latter was on Minnisink Plains in New Jersey, about eight miles south of Port Jervis, Orange County. It was obviously known to the Dutch long before Van der Donck wrote the name. It was visited by Arent Schuyler, a credited interpreter, who wrote, in his Journal, Minissink and Menissink as the name of the tribal seat. Although it is claimed that there was another council-seat on the East Branch of the Delaware, that on Minisink Plains was no doubt the principal seat of the tribe, as records show that it was there that all official intercourse with the tribe was conducted for many years. Schuyler met sachems and members of the tribe there and the place was later made a point for missionary labor. Their village was palisaded. On one of the early maps it is represented as a circular enclosure. In August, 1663, they asked the Dutch authorities at New Amsterdam, through *Oratamy*, sachem of the Hackinsacks, "For a small piece of ordnance to use in their fort against the *Sinnakas* and protect their corn." (Col. Hist. N. Y., XIII, 290.) In the blanket deed which the tribe gave in 1758, to their territory in New Jersey, they were styled "Minsis, Monseys, or Minnisinks." *Minsis* and *Monseys* are convertible terms of which the late Dr. D. G. Brinton wrote: "From investigations among living Delawares, *Minsi*, properly *Minsiu*, formerly *Min-assin-iu*, means 'People of the stony country,' or briefly, 'Mountaineers.' It is the synthesis of *Minthiu*, 'to be scattered,' and, *Achsin*, 'stone,' according to the best native authority."

In writing of "The Indians under the English," Rutenber¹ says:

The *Minnisinks* hesitated at first to embark in the war [of 1688], and sent Paxinos, their chief, to New York to consult with Governor

¹ *History of the Indian Tribes of Hudson's River*, p. 178.

Dongan in regard to the matter.¹ They subsequently contributed their quota, however, and rendered important service.

At the outbreak of the war the *Shawanoes* were contesting the advance of the *Iroquois* in the South, and were also engaged in war with the *Cherokees*. In the latter they suffered severely, and but for the timely aid of the *Mahicans*, would have been destroyed. The *Lenapes* [Delawares] invited them to remove to their country; the invitation being accepted, the *Minsis* brought the matter to the attention of the government of New York, in September, 1692, on an application to permit their settlement in the Minnisink country. The council gave its assent on condition that they should first make peace with the Five Nations.² This was soon effected, and the messengers departed, accompanied by Arnout Vielle, an interpreter, and three Christians, to visit the country of the *Shawanoes* and consummate the transfer. . . . Captain Arent Schuyler visited the *Minnisinks* in February, and there learned that the *Shawanoes* were expected early in the ensuing summer. This expectation was realized.³

The following journal of Captain Arent Schuyler's visit to the Minisink country⁴ in 1693 or 1694 is given in full, as it is the first account of an official visit to this section.

Journal of Captain Arent Schuyler's Visit to the Minisink Country.
May it pleas your Excëll.

In persurance to y^r Excëll: commands I have been in the Minnisink Country of which I have kept the following Journall: viz^t

169³ y^e 3^d of Feb: I departed from New-Yorke for East New-Jersey and came that night att Bergentown where I heired two men and a guide.

y^e 4th Sunday. Morning. I went from Bergen & travilled about ten English miles beyond Haghkingsack to an Indian place called Peckwes.

y^e 5th Monday. From Peckwes North and be West I went about thirty-two miles snowing and rainy wether.

¹ This the author amplifies by the following note: "'Ordered, that a message be sent to Minnisinks, to order them to send up their young men to Albany to join with the Five Nations against the French.'—*Council Minutes*, May 6, 1688."

² River Indians returned from a residence with the *Shawanoes*, brought with them some *Shawanoes* who intended to settle with the *Minnisinks*, asking permission to that end. Council directed that the *Shawanoes* must first make peace with the Five Nations.—*Council Minutes*, Sept. 14, 1692."

³ Ruttenber, *History of the Indian Tribes of Hudson's River*, pp. 180-181.

⁴ *Documents Relative to the Colonial History of the State of New York*, vol. iv, pp. 98-99, Albany, 1854.

y^e 6th Thursday. I continued my Journey to Maggaghkameick¹ and from thence to within half a days Journy to the Mennissinck.

y^e 7th Wendsday. About Eleaven a Clock I arrived att the Minnisinck, and there I mett with two of ther Sachems and severall other Indians of whome I enquired after some news, if the French or their Indians had sent for them or been in y^e Mennissinck Country Upon wth they answered that noe French nor any of the French Indians were nor had been in the Mennissinck Country nor there abouts and did promise y^t if y^e French should hapen to come or y^t they heard of it that they will forthwith send a mesinger and give y^r Excellency notice thereof.

Inquireing further after news they told me that six days agoe three Christians and two Shañwans Indians who went about fifteen months agoe with Arnout Vielle into the Shañwans Country were passed by the Mennissinck going for Albany to fech powder for Arnout and his Company; and further told them that s^d Arnout intended to be there wth seaven hundred of y^e said Shañwans Indians loaden wth beavor and peltries att y^e time y^e Indian Coarn is about one foot high (which may be in the month of June.)

The Mennissinck Sachems further s^d that one of their Sachems & other of their Indians were gone to fech beavor & peltreis which they had hunted; and having heard no news of them are afraid y^t y^e Sinneques have killed them for y^e lucar of the beavor or becaus y^e Mennissinck Indians have not been wth y^e Sinneques as usiall to pay their Dutty, and therefore desier y^t your Excèll. will be pleased to order y^t the Senneques may be told, not to molest or hurt y^e Mennissincks they being willing to continue in amity with them.

In the afternoon I departed from y^e Minnissincks; the 8th, the 9th, & 10th of Feb. I travilled and came att Bergen in y^e morning and about noone arrived att New Yorke.

This is may it pleas your Excèll. the humble reporte off your Excellency's most humble servant.

ARENT SCHUYLER.

Another early reference to the Minisink village appears in the work of Thomas Budd,² published originally in 1685:

¹ The Indian name of the river Neversink, which falls into the Delaware, a little south of Port Jervis, Orange County, New-York. *Eager's History of Orange County*, 392.—ED.

² *Good Order Established in Pennsylvania & New-Jersey in America*. Reprinted, Cleveland, 1902, p. 26.

From the Falls of Delaware River the Indians go in Cannows up the said River, to an Indian Town called Minisinks, which is accounted from the Falls about eighty Miles; but this they perform by great Labour in setting up against the Stream; but they can come down with ease and speed; the River from the Falls runs from the North and North-West and about twenty miles, as I my self observed in my Travel so far by the River, but by the Indians Information, it cometh about more Easterly farther up. I have been informed, that about Minisinks, by the River-side, both in New-Jersey and Pennsylvania is great quantities of exceeding rich open Land, which is occasioned by washing down of the Leaves and Soil in great Rains from the Mountains, which Land is exceeding good, for the raising of Hemp and Flax, Wheat, or any other sorts of Corn, Fruits, Roots &c.

In the second edition of Adriaen Van der Donck's *Beschryvinge van Nieuw-Nederlandt*, published at Amsterdam in 1656, appears a map of "Nova Belgica sive Nieuw Nederlandt" (see our pl. 1). On the Zuydt Rivier (the South or Delaware), at a point some distance south of and on the same side as the town called Mechari-enkonck, there is a locality designated "t'Schichte Wacki" on the map. This is the exact situation of the Minisink town. The meaning of the full name is unknown, but *wacki* signifies "place of." Ruttenber,¹ in speaking of the Minisink, says: "Their village was palisaded. On one of the early maps it is represented as a circular enclosure."

Incorporated in a work published in 1747² is a map showing an old Indian trail extending from Navesink, on Shrewsbury river, just south of Sandy Hook, to the bank of the Delaware, ending at a point opposite Minisink island at approximately the place where Minisink village and its burial place were situated. This trail, as shown on the map, is called "Minisink Path. Indian Path from Navesink to Minisink." Minisink island is likewise shown. This is another indication that Minisink was the most important settlement of the tribe, probably its council village.

¹ *Footprints of the Red Men*, op. cit., p. 221.

² *A Bill in the Chancery of New Jersey at the Suit of John Earl of Stair, and others, Proprietors of the Eastern-Division of New Jersey against Benjamin Bond and some other Persons of Elizabethtown, Distinguished by the Name of the Clinker Lot Right Men.* With three maps. New York, James Parker, 1747.

Faden's map of The Province of New Jersey¹ places "Minising" at the mouth of the small stream which is given the name of "Minising Creek or West Brook." The town is represented by three small pyramids. "Minising Island" is also shown.

The Minisink village is noted, with varied orthography, on a number of early maps, but the only one that indicates what might have been intended as a symbol for a circular enclosure is that of Sauthier,² dated 1779, which represents the village by means of a small circle surrounded by five pyramidal figures; the circle, however, is such as is generally employed for indicating any village. This cartographer locates the Minisink settlement on the northern bank of a small unnamed stream that flows into Bena Kill at this point.

On a Historical Map of Pennsylvania³ there is shown on the Delaware river, opposite Minisink island, at approximately the place where the cemetery stood, three parallel marks, and "Mine-sink I. T.," meaning Indian town. The island is given as "Minising Island."

It should here be noted that the names of abandoned villages were frequently retained on early maps as if the settlements themselves were still inhabited.

PREVIOUS ARCHEOLOGICAL WORK IN THE VICINITY

L. W. Brodhead⁴ gives a description of graves opened in a cemetery near the Delaware Water Gap. He says:

The following extracts from a letter written by a gentleman who, with others, visited the Indian burial-place near the Gap, in the autumn of 1865, is deemed not out of place in this connection. The letter was published in the *North American and United States Gazette*: "Various

¹ Faden, *North American Atlas*, London, 1777.

² *A Chorographical Map of the Province of New York in North America*, London, January 1st, 1779.

³ *Historical Map of Pennsylvania showing the Indian Names of Streams and Villages, and Paths of Travel, etc.*, edited by P. W. Sheaffer, and others. Publication Fund of the Historical Society of Pennsylvania, Philadelphia, 1875.

⁴ *The Delaware Water Gap: Its Scenery, its Legends and Early History*. Second ed., Philadelphia, 1870, pp. 115-124.

localities of interest are pointed out as the sites of Indian villages and burial-grounds. . . . One of these early cemeteries has long been regarded with interest by visitors to the Gap and residents of the neighborhood. In vain, however, did those desirous of exploring it apply for permission to the proprietor of the soil. But . . . certain parties met, not having the fear of Mr. Zimmerman . . . before their eyes, and under the cover of night and a dense young forest, perpetrated that which men of science had ineffectually attempted. It may not positively be known what articles have been taken from the despoiled graves, but I have been informed that among the articles found was a finely wrought stone pipe. With this digression, I will give a brief account of our operations to-day. We found the cemetery composed of numerous 'graves,' in close proximity to one another. These were scarcely distinguishable, so slight is the elevation. Each grave is encircled by a trench, and a group of some half a dozen had evidently been surrounded by a gravel ditch. The circumvallation was quite distinct. Selecting an undisturbed spot, we put a couple of stout men to work. Removing the soil, we were convinced human agency had been at work. Instead of the gravel, which marks the diluvial, we found a coarse yellow sand, intermingled with clay. At the depth of about two and a half feet, we found an ulna, or some other parts of a human frame. The skeleton was in tolerable preservation. The cranium is in good condition, with the exception of a portion of the right superior maxillary, which appeared missing. The teeth are in good preservation, but much worn by the use of maize. The sections indicate a person of about middle age. The frame was large, and doubtless that of a male. The mode of burial had been by inhumation; placing the body in a recumbent posture, extending from east to west, the face looking eastward. A slight cist had been excavated, which received the body, free from cement or stone incasement, and having placed with it the few personal articles which ornamented it in life, a careful covering of sand was made to the height of the cist, and terminating in a small tumulus. The sand had evidently been carried from the river's beach, as it is not found at a nearer point. This is a peculiarity, and worth attention. Of the articles of personal adornment recovered were parts of two metallic ornaments, brooches, or ear-drops, found in close proximity to the head. They are an alloy, pewter perhaps, circular in form, and two inches in diameter. Also, two spiral wire springs of brass, one inch in length and half an inch in diameter, and three bone or shell beads, one quite large. These are by far the most valuable and interesting relics recovered, as they are purely aboriginal, while the metallic articles

are of European fabrication. In addition to those discovered was the rude form of a pocket-knife, but so oxidized as to be almost undistinguishable. Of course, these articles, with the exception of the bone beads, are of white men's manufacture, and utterly valueless to the archaeologist."

We incorporate the following extract from *Bulletin 40 of the New York State Museum* concerning archeological work conducted by that institution in 1909:

In September the assistant in archeology was sent to Port Jervis to excavate the site of a Minsi village and burial ground . . . Little or nothing is known regarding the archeology of the Minsis nor was it possible to determine from an examination of the Port Jervis site much concerning their culture except in the line of their mortuary customs.

The Van Etten site, the site of the Minsi village and burial place is found on the Levi Van Etten farm on the east bank of the Minisink river, two miles from Port Jervis. Excavations conducted during the months of September and October, 1909, by the assistant in archeology resulted in the discovery of 30 graves and several hearths and refuse pits. The latter contained little of interest, only a few potsherds and rude flints being found with them. An examination of the burials proved that the Minsis had for some time been influenced by the white men about them. Some of the skeletons seem to have been buried in rough wooden boxes. The position of all skeletons found in what appeared to be the remains of boxes was the extended position instead of the flexed position generally found in old burials in this State. Most of the objects found in the graves were of European origin. These objects include beads of several sizes and shapes, brass and iron finger rings, brass bracelets, brass bells of two forms, one bronze soup spoon, one clay pipe stamped R. Tippet, and brass buttons. The aboriginal artifacts found in the graves were all shell ornaments, probably pendants or gorgets.

In 1872 Ruttenber¹ described this site as follows:

On the east bank of the Neversink river, three miles above Port Jervis, on the farm now or late of Mr. Levi Van Etten, exists an Indian burial ground, the graves covering an area of six acres. Skeletons have been unearthed, and found invariably in a sitting posture, surrounded by tomahawks, arrow-heads, etc. In one grave was found a sheet iron tobacco box containing a handkerchief covered with devices, employed doubtless to preserve the record of its owner's services.

¹ *History of the Indian Tribes of Hudson's River*, Albany, 1872, p. 96.

SITUATION OF THE MINISINK CEMETERY

From the foregoing historical data it is evident that the burial place excavated by the Museum of the American Indian belonged to the Munsee and that it was near the site of Minisink. The cemetery is on what was originally the Westbrook estate in Sandyston township, but is now owned by Burson W. Bell, Esq., who married a descendant of the Westbrooks, the property having remained in continuous possession of the family for seven generations. The site lies four miles southwest of the Milford toll-bridge, on both sides of the historic "Mine road," the portion on which the cemetery was situated stretching from this highway to the bank of Bena Kill, which forms the eastern boundary of Minisink island.

For many years the Bell farm has been noted in connection with a so-called "Indian fort," situated a short distance from the Bena Kill, which is merely the ruin of an old stone house said to have been used by the settlers in repelling attacks of Indians. Many evidences of Indian occupancy have been found on the surface, and about twenty years ago Dr Edward S. Dalrymple, of Branchville, New Jersey, unearthed a number of skeletons in a sandy plain near the bank of the creek. Since that time Mr Westbrook, Mr Paul Tooker of Westfield, New Jersey, and others have dug into the burial place, and four years ago Mr Bell, the owner of the farm, in plowing on the opposite or sloping side of the hill, unearthed the skeleton of a child with which were several shell ornaments as well as objects of European manufacture.

The cemetery proper is on the south bank of the Bena Kill, opposite the lower end of Minisink island. At this point the creek bluff is about thirty feet in height. Near the bank the surface is level, but it stretches inland, forming a series of low sand-dunes. The eastern end of the burial area has the appearance of a low, broad mound, and for convenience of reference it will be known as such in this paper. A few hundred feet east of the mound are a series of higher dunes having the form of ridges: these are at the lower edge of the plateau that extends to the base of the range which parallels the river.

The mound presented no physical indication of its use as an

aboriginal cemetery. It extends several hundred feet from the bank of the stream, but only the portion nearest the creek was utilized for burial purposes. It is a natural sand-dune, similar to the dunes of greater or lesser height that extend for miles along the New Jersey bank of the Delaware, but when examined by our party numerous stone implements and potsherds were found on its surface. On the crest of the mound, fragments of human bones, including portions of skulls, and parts of tubular shell beads were found. These had been upturned by the plow, thus indicating the shallowness of some of the burials.

Max Schrabisch, in his "Indian Habitations in Sussex County, New Jersey,"¹ describes Minisink island and also the village site on the mainland. Concerning Minisink island, he says:

This island lies about 15 feet above normal water level of Delaware River and is practically level. There was a camp site and fishing place at its northern end, where arrow-points of flint and jasper as well as net sinkers of a type quite common in Delaware Valley and usually consisting of flat oval pebbles notched on opposite sides were once fairly abundant. Situated as it is in the immediate neighborhood of the Great Minisink village and separated from it only by the river channel, it may seem strange that it was apparently the site of only one camping ground, although the fact that it is flooded wholly or in part in periods of high water probably accounts for this. However, scattered relics were found in at least two places.

Continuing, he speaks of the village as follows:

The Great Minisink village was situated directly south of Minisink Island on high level land overlooking Delaware River. Artifacts of every description have been found here, and many of them are now in Burson Bell's collection. . . . A burial ground adjoins the village site, many of the graves encroaching upon and intermingling with the lodge sites.

In speaking of the discoveries made by Mr Bell, he writes:

One grave discovered accidentally by Mr. Bell while ploughing, contained some extraordinary rare objects, exhibiting the highest degree of workmanship ever attained by the Lenni Lenâpé. Along with a piece

¹ *Bulletin 13, Geological Survey of New Jersey*, 1915, pp. 28-30.

of burnt mica, a piece of zinc, a stemmed jasper scraper and twelve dark blue beads, he found eight white stone tubes, one-quarter of an inch in diameter and from two to four inches long, used perhaps by the medicine man to draw disease from the sick. But the *pièce de résistance* were two exquisitely carved ornaments of an immaculate white color, representing hawks or eagles. These ornaments, designated as ceremonial objects (bannerstones), mark perhaps the grave of a chief and are now in Bell's collection.

The shell birds mentioned by Mr Schrabisch, now the property of the Museum of the American Indian, are herein described and illustrated (figs. 12, 13). Mr Schrabisch gives two crudely drawn and rather misleading sketches of these ornaments, which he designates "bannerstones." The "stone tubes," also in the Museum of the American Indian, are in reality shell ornaments, under which caption they are described in the present paper.

PREVIOUS WORK IN THE CEMETERY

Dr Dalrymple evidently did considerable digging in the northwestern part of the mound, but, so far as known, no measurements or photographs were taken. His investigations proved that the Indian inhabitants had been in contact with white settlers and that some of the bodies had been buried within the historical period. There is sufficient evidence to show that at least fifteen skeletons were exhumed by this investigator. With one of the bodies, that of a child, was a copper kettle; a silver spoon; a necklace composed of two shell beads, two glass beads, eleven thimbles, and one bell, tied to which were the remains of a deerskin thong; a bone comb; and eight copper bracelets which



FIG. 2.—Bone comb found by Dr Dalrymple.

were found on the right wrist. Graphite and animal bones also were found in the grave. The skeleton lay 18 in. beneath the surface, the skull directed S.

The bone comb found in this grave is shown in figure 2; it measures $3\frac{1}{2}$ in. in height and $1\frac{3}{8}$ in. in width. The upper part is ornamented with the figure of a wolf or a dog. The neck and head of the animal are carved in the round, the shoulders project, and the legs are in low relief. Similar combs are not uncommon in Iroquois sites in the State of New York.

With most of the skeletons exhumed by Dr Dalrymple nothing was found; with one, however, there was a pewter pitcher, a pair of copper ear-ornaments, and seven shell beads.

INVESTIGATIONS BY THE MUSEUM OF THE AMERICAN INDIAN

Owing to the fact that human remains had been removed from various parts of the mound, a series of test trenches were dug. The first, extending through the southeastern edge, gave no indication of disturbed soil. The second trench was dug nearer the eastern exposure, and it was here that the first indications of burials were encountered. From this point trenches were dug to the extreme northwestern part of the burial area, and ultimately the greater part of the mound was excavated. The position of each burial is shown on the accompanying plan (pl. II).

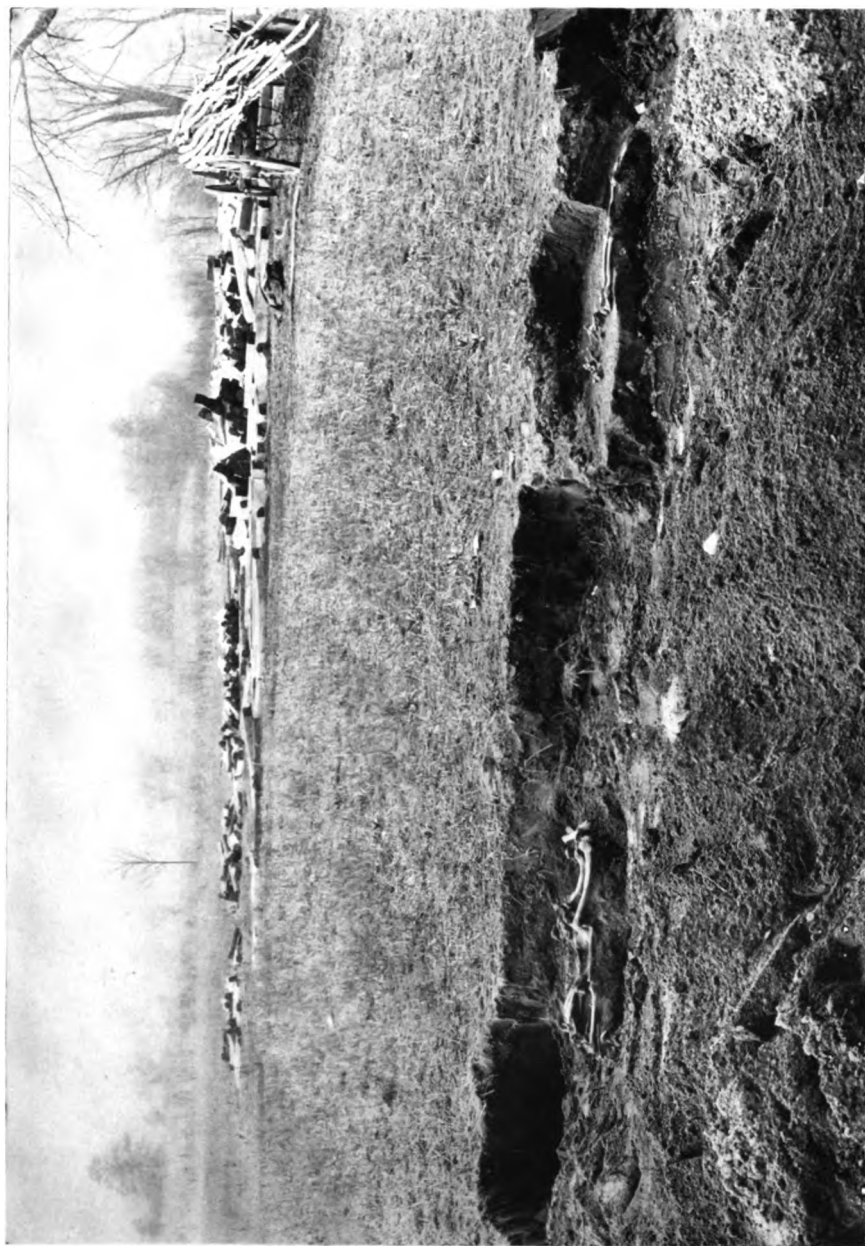
THE BURIALS

The first evidence of disturbed earth was noted at the central part, just below the surface soil and extending to a depth of 4 ft. 8 in., its greatest width being 2 ft. 6 in. At a depth of 2 ft. 6 in., half of a pitted hammerstone, split by fire, was found. Just above, at the edge of this disturbed soil, was a large piece of deer antler. There were traces of charcoal in this pit, but no evidences of a burial.

A second pit was encountered near this one; in size it was practically the same as the one just described. In it, at a depth of 2 ft. 1 in., a pestle and a flat stone were found.

Following is a description of the burials uncovered during the excavations in the cemetery.

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SKELETON 2 (AT THE RIGHT) AND SKELETON 3 (AT THE LEFT) IN SITU IN THE EASTERN PART OF THE CEMETERY

Skeleton 1, which lay 3 ft. 3 in. below the surface, was that of an old person, but only a portion of the skull and a few other bones grouped about it were found. This may have been a reburial, but as there were indications of the burrowing of groundhogs in the mound, the missing bones may have been carried to the surface by these animals.

Skeleton 2, that of a child, was found in clearing away the surface soil. The body lay on its back in an extended position with the legs together, the right foot folded over the left; the cranium was 10 in. below the surface. The bones of the lower part of the body were in place, but above the pelvis all the bones had been disturbed and the cranium had been torn apart, a portion of it being missing. The body lay NE by SW, the head directed toward the latter point. The disturbed sand of the mound extended but a few inches below the skeleton. Above the burial were pieces of charcoal, a few deer-bones, and fragments of pottery, but no objects were in direct association. (See pl. III.)

Skeleton 3, an adult, lay on its right side, the body extending NE by SW, the head having been toward the SW. The legs were flexed and the arms extended along the sides of the body. The pelvic bones were one foot below the surface, but the skull doubtless was somewhat shallower and had probably been destroyed by plowing, as no positive trace of it could be found. Fragments of the skull of an adult found on the surface near this point, however, may have belonged to this burial. Nothing was found with the skeleton. (See pl. III.)

Skeleton 4 consisted of part of a cranium and a mass of ribs and other bones of a child. These remains were grouped in the lower part of and just below the surface soil. The cranium had been broken, no doubt by plowing, the disturbed portion resting on the frontal bone. The occiput was $7\frac{1}{2}$ in. below the surface. Nothing was found with this burial.

Skeleton 5, an adult, lay extended NE by SW in the surface soil, an inch above the undisturbed sand. The head had been directed SW. The upper part of the body had been disturbed, both the cranium and the lower jaw being missing, but below the

pelvis the skeleton was complete. The upper part of the pelvic bone was only $3\frac{1}{2}$ in. beneath the surface. Nothing was found with this burial.

Skeleton 6, an adult, undisturbed, lay on its right side, the legs flexed, the arms bent upward, the hands under the chin. The top of the cranium was 14 in. below the surface. Under and around the hands and beneath the chin were a large number of small glass beads, and also under the chin were two small pieces of chipped flint. Above the neck were thirty-seven large, spheroidal, glass beads, and two beads made of olivella shells. A few inches from the occiput a flat piece of limestone was found. Between the arms and just below the point of the chin were two clay pipes of European manufacture (pl. IV, *a*; XIV, B, *a*, *e*). Two feet west of the skeleton were evidences of a feast-pit, shown by a discolored area, irregular in shape, in which were found pieces of charcoal, fragments of split animal bones, two potsherds, and three arrowpoints.

Skeleton 7, a child, was on its back, with arms against the sides and legs extended. The skull was crushed, as if a heavy weight had pressed upon the frontal bone. The body lay NE by SW, the head toward the SW, 13 in. below the surface. About the neck and under the chin were twenty-one small, black, glass beads, a large bead of white glass, and six shell disc-beads. The disc-beads were lying in a row with the glass beads between them. Between two of the disc-beads were four of glass, each pair being connected with a small, dull-green, tubular bead of copper, the salts of which had preserved the cord, thereby holding the beads, which formed a necklace, in their original position. The restored necklace is shown in plate VIII, *a*. A photograph of the skeleton is reproduced in plate IV, *b*.

Skeleton 8, that of an adult, was lying NE by SW, with the head in the latter direction. The skull, which was broken, together with the upper part of the vertebræ, had been displaced, and the bones of the lower part of the body had likewise been disturbed. The body was lying on its back, with arms extended. Within two inches of the cervical vertebræ was a deposit of wire ornaments and five tubular shell beads, and the remains of what seemed to be

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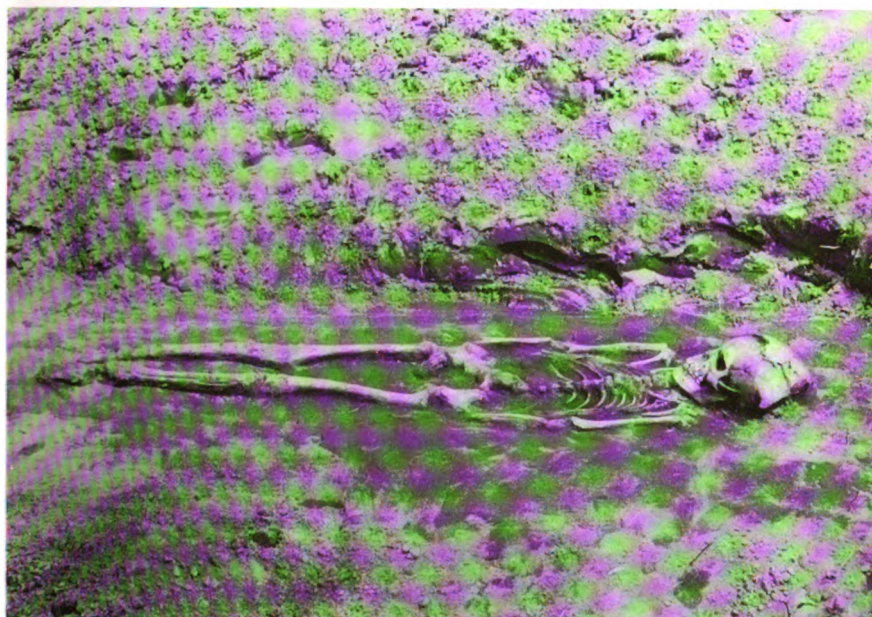
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EXCAVATIONS



a. SKELETON 6 WITH EUROPEAN CLAY PIPES



b. SKELETON 7, AN EXTENDED BURIAL

a rush bag, in which evidently the objects had been buried. The shell beads lay under the mass and rested on a piece of bark. At the ends of some of the shell beads were two glass beads, as shown in plate v, *b*; others had but one glass bead at the end. As there were ten glass beads in the deposit, it is probable that the beads had formed a necklace and that two glass beads alternated with the shell tubes. The wire pieces were in the form of flat coils, but were broken and corroded to such an extent that their original form could not be determined. From the position and condition of the deposit, and from the fragments of fiber found above and below the objects, it would seem that the ornaments had been wrapped in a piece of bark, or placed in a fiber bag which was then wrapped in bark. In removing the cranium a shell pendant (fig. 8, *a*) was found. The upper part of the cranium was discolored by contact with red paint, pieces of which still adhered to it. Another portion of the cranium was stained with copper salts, but the metal that caused it had disappeared. (Pl. v, *a*.) Southeast of the leg-bones and joining the burial was a feast-pit extending to a depth of one foot below the skeleton. In this pit, and nearly a foot below the level of the leg-bones, a large piece of the rim of a jar was found, likewise a number of chipped stones, and deer-bones that had been cracked evidently for the purpose of extracting the marrow. Throughout the pit were pieces of charcoal, and above the objects mentioned were numerous animal bones, potsherds, and a broken drinking-cup made of the carapace of a box-turtle.

Skeleton 9, an adult, $7\frac{1}{2}$ in. below the surface, lay NE by SW, on its right side, the legs flexed, and the skull directed SW. The left arm was in front of the face, the hand under the chin. There were no accompaniments.

Skeleton 10, a child, was found 16 in. below the surface. The skull lay with the occiput toward the south; the other bones were grouped about and under it, the major portion being on the northern side of the skull, thereby showing that, like most of the other burials, the body had been interred with the head toward the SW. The skull, a few of the vertebræ, and the ribs, were the only bones present. This may have been a reburial, which would account

for the missing parts. Under the chin were three triangular shell pendants (fig. 8, *b-d*), and a shell ornament shaped like a porpoise (fig. 15). Sixty-five glass beads were found with the pendants.

Skeleton 11 was that of an adult. The bones had been disturbed; the skull lay at the southwestern end of the scattered bones. Many of the vertebræ were ankylosed. Deer-bones and charcoal were found intermingled with the bones of the skeleton, but these evidently were the remains of a feast, as there was a feast-pit immediately northeast of and in juxtaposition to the skeleton, in which were two large pieces of a pottery jar, evidently in their original positions. One of the leg-bones of the skeleton lay just above the pottery, but no doubt it had been forced out of place when the other bones were disturbed. Above and around the sherds of the jar were pieces of charcoal and animal bone.

Skeleton 12 was that of an adult, the skull of which was 14 in. below the surface. The body was lying on its back, with legs extended; the arms lay parallel with the sides of the body, and the hands rested on the pelvis. The tibiæ, fibulæ, and foot-bones had been disturbed. The skull, which was directed SW, had been crushed, but was lying in its natural position, with the lower jaw in place. No artifacts were found with this burial. The discolored sand continued west of the skeleton, but there were comparatively few animal bones in it.

Skeleton 13, an adult, the skull 11 in. below the surface. The body lay on its right side, with the legs flexed and the skull toward the SW. The arms were bent upward; the hands rested against the chin. A bear-tooth, found directly beneath the skull, was the only accompaniment of this burial.

Skeleton 14, a child, with the skull 13 in. below the surface. The body lay on its back, with legs extended and with the arms at the sides. The skull, which was crushed, was directed SW. A piece of limestone rested on the chest. The bones of the skeleton had been disturbed.

Skeleton 15, a child, 18 in. below the surface. The bones were scattered and the cranium was missing. There were no burial accompaniments.



a. SKELETON 8 WITH DEPOSIT OF ORNAMENTS NEAR SHOULDER



b. BEADS AND WIRE ORNAMENTS WITH SKELETON 8

Skeleton 16, a child, 17 in. below the surface. The cranium had been crushed. The body lay extended on its back, the skull directed S. A small flat stone was found under the jaw.

Skeleton 17, a child, the skull 20 in. below the surface. The body was on its back, with legs extended and the head pointing SW. Under the jaw were nine tubular beads and one spherical shell bead, also many small glass beads, and eighteen beads of yellow glass made to represent grains of corn.

Skeleton 18, a young child, lying on its back, with legs extended. The skull, which had been crushed, was toward the SW and lay $6\frac{1}{2}$ in. beneath the surface. A few inches below the jaw and resting on the upper ribs was a bird ornament of shell (fig. 10). About the neck were a number of small glass beads, and nine cylindrical shell beads. This body had been interred over another (*Skeleton 19*)—the only instance of a superimposed burial in the mound.

Skeleton 19, which lay 14 in. below *Skeleton 18*, was that of an old person. The body evidently had been lying on its side, with legs flexed and the head toward the SW. The skull had fallen from its normal position and lay nine inches below the cervical vertebrae; the occiput was upward and the lower jaw a few inches above it.

Skeleton 20 is that of a white man of the Scandinavian or Nordic type. It was buried on its right side, with legs flexed. The cranium was 11 in. below the surface and was directed SW. The bones were in their normal positions, but most of them, including the skull, had been broken, as though by pressure. In the mouth cavity a piece of rock crystal was found.

Skeleton 21, an adult, 8 in. below the surface. The bones, especially the skull, were broken and disturbed, but the general position showed that the head had been toward the SW. Nothing was found with the burial.

Skeleton 22, a child, lay on its back, 8 in. below the surface. The skull had been crushed, and the bones were broken and scattered, but the head had been toward the SW. Nothing was found with this burial.

Skeleton 23, an adult, lying on its left side with arms and legs

flexed, and with the hands above the head. It was 16 in. below the surface; the head was directed SW. There were no accompaniments.

Skeleton 24, an adult, 10 in. below the surface; lying on its back, with head toward the SW. The arms were akimbo, with the hands resting on the pelvis. The legs were extended, the left crossing the right at the ankles. Resting against the left shoulder was a deposit of objects consisting of two flints and fragments of a steel, two circular mirrors with metal backs (pl. XVI), a clay pipe of European manufacture (pl. XIV, B, *d*), and a pewter pipe (pl. XIII, *c*).

Skeleton 25, a young child, 15 in. below the surface. The body was lying E and W, with the skull toward the W. The skull was crushed and the other bones were in bad condition. Nothing was found with the burial.

Skeleton 26, a child, lying on its back, with legs extended. It was 8 in. below the surface; the head was directed SW. The bones had been disturbed and were in bad condition; the skull was crushed. Lying so that it nearly touched the lower jaw was a long shell pendant shaped like a lamprey eel (fig. 16), and below it was a shell disc (fig. 6).

Skeleton 27, a child, 14 in. below the surface. It was lying N and S, with the skull toward the S. The skull was badly crushed and the bones of the body were much decayed. Nothing was found with it.

Skeleton 28, an adolescent, lying on its back, with legs extended and with arms at the sides. It was 7 in. below the surface; the head was toward the SW. The skull was crushed, but the other bones were in their normal positions. Six inches beneath the skeleton and a little to the west of it was a layer of clam-shells under which was a hammerstone and several deer-bones.

Skeleton 29, 9 in. below the surface, was that of a child which was lying on its back. The arms rested at the sides, the legs were extended, and the left foot was crossed over the right. The body was lying with the head toward the SW. When the first indication of this skeleton was encountered, careful search was made in the earth that had been thrown out with a few finger-bones. In this



a. SKELETON 31 WITH DEPOSIT OF BONE TUBES AND PIPES



b. BONE TUBES AND PIPES, AND UPPER PART OF SKELETON 31

were two shell crescents (fig. 4), a metal spoon (pl. xvii), six catlinite beads of irregular form, a tubular shell bead, and many small glass beads, all of which evidently had been held in the right hand. Near the left knee a small metal bell (pl. xvii) was found. Not far from the pelvic arch and resting against the left femur was a deposit of ornaments consisting of a shell disc, a small metal bell (pl. xvii), and a catlinite bead with serrated edge.

Skeleton 30, a child, the skull of which lay 14 in. below the surface. It was lying extended on its back, the skull directed E, the arms at the sides and the legs extended. On the breast and almost touching the lower jaw was a bird ornament of shell (fig. 11); below and around it were many small glass beads. Under the right cheek-bone was a cylindrical shell bead. The shell bird and this bead are shown in plate VII, *a*. About the neck were the beads of a necklace, of which the shell bird no doubt was the pendant. This necklace consisted of six shell disc-beads, nine wampum beads, and a number of glass beads. The number of disc-beads is the same as that noted in connection with *Skeleton 7*, and the necklace evidently had been similar in form, the relative position of the pieces being shown in plate VIII, *a*. Small pieces of red paint were mingled with the beads, and under the occiput was a mass of similar material. (Pl. VII, *b*.)

Skeleton 31, an adult, lying on its right side, with legs flexed. It was 13 in. below the surface, and the head was toward the SW. On the right side of the body, near the ribs, was a clay pipe (pl. XIV, B, *b*) that evidently had been broken before being deposited with the burial, as the stem was lying below the stem of a pewter pipe, while the bowl was level with the latter. The bowl of the pewter pipe (pl. XIII, *a*) was beneath a deposit of six bird-bones which probably had been used as medicine tubes (pl. VI).

Skeleton 32, an infant, lying NE and SW, with the head toward the SW. It was 17 in. below the surface, and many of the bones were missing. There were no accompaniments.

Skeleton 33 was that of an adult which lay on its back with the arms at the sides. It was 9 in. below the surface, with the head SW. The skull, which was broken, lay in a mass of red paint and char-

coal. Near the left upper part of the skull was a fragmentary turtleshell rattle, only a portion of the carapace of which remained, but the fragments show that it had been drilled. The lower part of the shell was broken, but all the pieces were recovered and show the instrument to have been ornamented with a design formed by drilled holes as shown in plate XI and figure 18. Mingled with the fragments of the rattle were 35 small glass beads, and 26 small pebbles which no doubt had been contained in the instrument when in working condition.

Skeleton 34 was that of an adult, found 10 in. below the surface, lying on its back with the legs extended, and with the head SW. No objects were found with it.

Skeleton 35, an adult, lay 14 in. down, the skull directed SW. The bones are well preserved, but nothing was found with them.

Skeleton 36, an infant, 11 in. down, with the head toward the SW. The leg-bones were missing and the other bones were badly decomposed. Below the lower jaw and resting on the chest were eight shell pendants, six of which represent owls (fig. 9), and two shell ornaments in the form of fish, also a number of shell and glass beads.

Skeleton 37, a child, was found lying on the right side, with the legs flexed. The head was toward the SW and was 1 ft. 9 in. below the surface. The hands were clasped under the head. Resting on the upper part of the skull were 45 shell beads.

Skeleton 38, an adult, found 1 ft. 7 in. down, consisted of a mass of dissociated bones that had been reburied.

Skeleton 39, an adult, lay on its back, with the head toward the SW and 11 in. below the surface. The hands were clasped on the breast. An upturned brass kettle (pl. XIV, A) was found with the rim resting on the forehead. Near the right scapula was a clay "trade-pipe," and under it another of similar size and make (pl. XIV, B, c, f). Near the pipe were three flints such as were used for striking fire. At one side of and near the pipes were two round mirrors in metal frames (pl. XVI), and in the right hand were two flints similar to those found near the pipes. (Pl. VII, B.)

Skeleton 40 was that of an adult; it was found 1 ft. below the surface and had been previously dug. No objects accompanied the burial.



a. SKELETON 30 WITH SHELL BIRD AND TUBULAR SHELL BEAD



b. SKELETON 39 WITH BRASS KETTLE ON HEAD

Skeleton 41, an adult, lying on its left side, with legs flexed and head toward the W, was found 1 ft. 7 in. below the surface. The right hand rested against the pelvis, the left was under the skull. The left humerus and ulna were ankylosed at the elbow. Nothing was found with the body.

Skeleton 42, an adult, lay 7 in. below the surface. The skull was badly broken, and the bones of the upper part of the body had been disturbed, probably by plowing. The legs were flexed and their position showed that the body had rested on its left side. Nothing was found with it.

Skeleton 43, an adult, was represented by a mass of dissociated bones. The pelvis was 7 in. below the surface. This burial had been previously dug.

Skeleton 44 was that of an adult; it was lying on its back, with body extended; the skull was toward the SW, rested on its left side, and was 15 in. below the surface. On the right scapula was a short, round flaking-tool of antler, and under the skull was a bone awl (pl. x, B, f) and a bone flaking-tool.

Skeleton 45 was that of an adult, lying on its left side, 18 in. below the surface, with the skull toward the SW. The leg-bones, the bones of one foot, and those of the left arm were missing.

Skeleton 46, an adult, lay 2 ft. 3 in. below the surface. This burial had been previously dug.

Skeleton 47 was that of an adult, lying with its head toward the SW and 16 in. below the surface. Part of the skull was missing, and the upper part of the body had been disturbed.

Skeleton 48, an infant, was found 13 in. below the surface and with its head toward the SW. The bones were in poor condition and had been disturbed.

Skeleton 49, an infant, was in very poor condition; it was found 17 in. below the surface, with the skull toward the SW.

Skeleton 50, an adult, lay 1 ft. 10 in. below the surface, with head toward the SW. The bones are well preserved, but the burial had been disturbed.

Skeleton 51 was that of a small child and was found 1 ft. below the surface. The only remaining portion was the skull, which was

badly crushed, but slight traces of decomposed bone showed that the head had been directed SW. Near the left side was a small brass kettle (pl. XIV, A), also a number of small, red glass beads.

Skeleton 52 was that of an adult and was found 1 ft. 8 in. below the surface. The bones had been disturbed and the skull was missing.

Skeleton 53 was that of an adult; it lay 16 in. below the surface and was extended on its back. The skull, which was badly broken, lay toward the SW. On the left wrist were four brass bracelets (pl. xv) and fragments of others. The ulna and the radius had been discolored by the salts of the metal. On the left scapula were two large shell pendants, each in the form of a fish (fig. 14). Under the chin were a number of small glass beads, also a small copper bead and another of catlinite.

Skeleton 54, extended on the back, was that of an adult and was found 16 in. below the surface, with the skull toward the SW.

Skeleton 55, that of a child, was found 9 in. down. It was lying extended on its back, with the head toward the SW.

Skeleton 56, an adult, was found 8 in. below the surface, with the head toward the SW; it rested on its right side, and the legs were flexed. The hands were under the chin. The lower leg-bones were deformed.

Skeleton 57, that of an adult, was found 15 in. below the surface, with the head toward the SW; it was lying on its right side, with legs flexed and hands under the chin. On the right side, and extending from the lower jaw to the pelvis, was a pewter pipe (pl. XIII, B) the rim of which is ornamented in relief with the figure of a wolf or a dog.

Skeleton 58, a child, lay extended on the back, 1 ft. beneath the surface, with the skull toward the SW. The arms were at the sides of the body. In each hand was a mass of fused iron. In association with this burial there were evidences of a feast, for over the body there was a broad discolored area in which were much charcoal and many cracked animal bones, mostly those of deer. Other burials showed evidences of accompanying feast-pits, but none was so strongly marked as this.





Skeleton 59, an adult, was 1 ft. 8 in. below the surface, with the head toward the SW. The body was lying on its right side; the legs were flexed. About the neck was a metal chain (pl. xvii). Seven cylindrical shell beads, and a shell pendant in the form of a beaver (fig. 17), were found at the back of the neck.

Skeleton 60, that of an adult, was found extended on its back, 13 in. below the surface, with the head toward the SW. The left hand was on the chest; the right was at the side of the body. A broken bowl rested on the head.

Skeleton 61, an adolescent, was found 15 in. below the surface, with the head resting on the right side, directed toward the SW. The skeleton lay on its back, with the body extended and the hands under the skull. Under the left shoulder were 130 small shell beads in rows, their position suggesting that they had formed part of a woven band, the beads of which were arranged as are those in a typical wampum belt.

Skeleton 62, a child, lay 1 ft. 9 in. below the surface, with the head toward the SW. The skull was broken.

Skeleton 63 was that of an adult; it was found 18 in. below the surface, with the head directed SW. The burial rested on its left side and the legs were flexed. The bones were in very poor condition.

Skeleton 64, an adult, 12 in. below the surface, with head toward the SW. The upper part of the body had been disturbed, but the leg-bones, which were flexed, were in position. The body was interred lying on its right side.

Skeleton 65, a child, 8 in. down. The bones had been disturbed and were in bad condition.

Skeleton 66, a child, 7 in. below the surface, with head toward the SW. The body lay extended on the back. Under the chin was an elaborately carved shell gorget (fig. 7) and fragments of iron. A bear-tooth also was found with the body.

Skeleton 67, an adult, the bones of which were in poor condition, was found extended on its back only 2 in. beneath the surface, the skull directed SW. On the left shoulder were two native pottery pipes (pl. xii, a b), fragments of iron just above the pipes, and a piece

of flint. The bowl of one of the pipes, which represents a human figure, was directed toward the skull; that of the other pointed toward the feet.

Skeleton 68, an adult, was found 10 in. below the surface, lying on its right side, with legs flexed and with the head toward the SW. The hands were under the chin.

All the skeletons that it was found possible to preserve have been presented to the United States National Museum, where they are now being studied by Dr Aleš Hrdlička. In the accompanying table is presented all necessary information in regard to the physical features of the burials encountered, so far as the present paper is concerned. An exhaustive report on the skeletons, by Dr Hrdlička, will be published in the near future.

A summary of the positions of the skeletons, so far as it was determinable in each case, is as follows:

Extended	28
Flexed.....	17
Disturbed	18
Previously dug	3
Reburial.....	1
Bones decomposed	<u>1</u>
	68

OBJECTS ASSOCIATED WITH THE BURIALS

SHELL ORNAMENTS

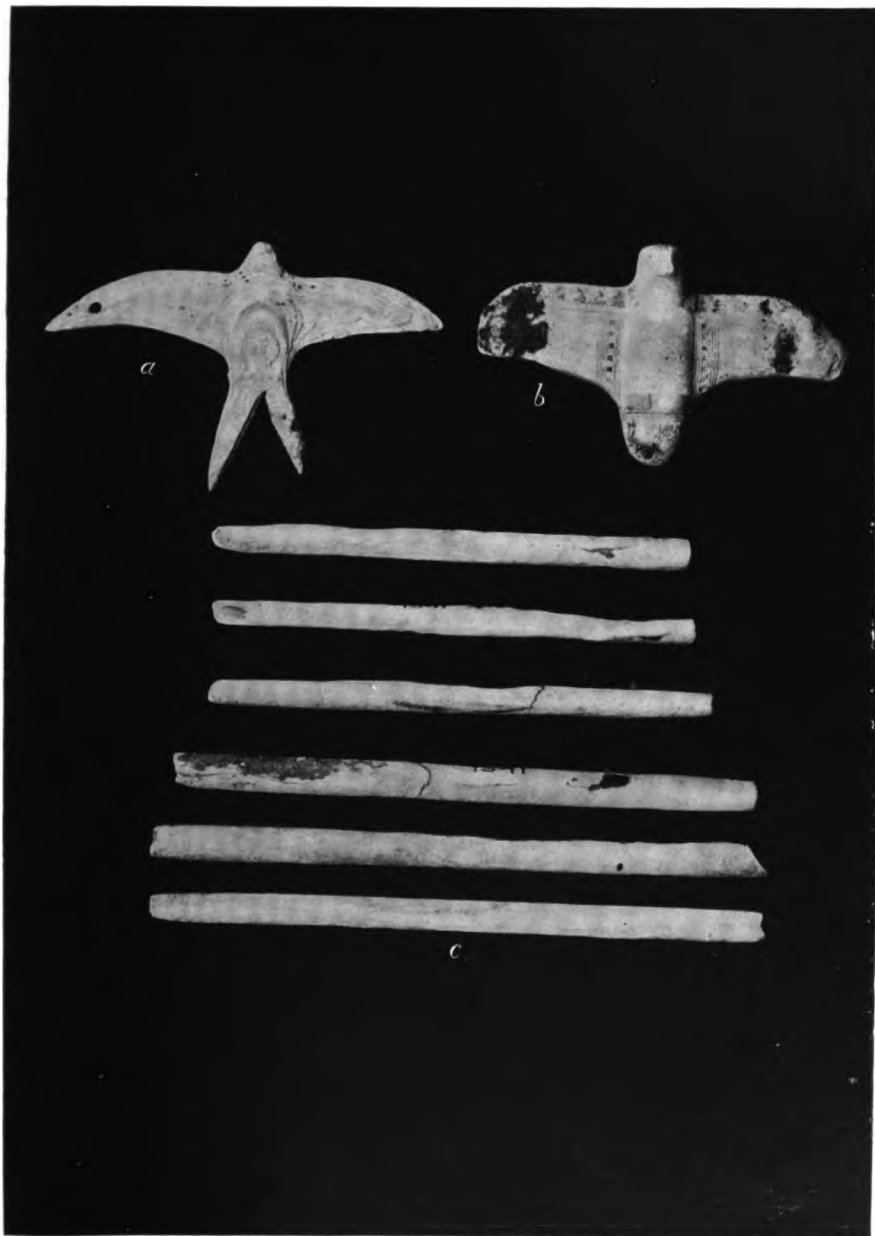
DISCS

Prof. W. H. Holmes, in his "Art in Shell of the Ancient Americans,"¹ says:

I present a number of illustrations of a class of relics which have occasionally been mentioned in literature, and which are represented to some extent in our collections. As these objects resemble beads rather more closely than pendants, I shall refer to them in this place, although Mr. Schoolcraft considers them badges of honor or rank, and treats them as gorgets. He describes them as consisting of a "circular piece of flat

¹ *Second Ann. Rep. Bureau of Ethnology*, p. 228.

TABLE SHOWING THE CHARACTER AND ARRANGEMENT OF THE BURIALS AND THE OBJECTS



BIRDS AND TUBULAR BEADS OF SHELL FOUND IN THE CEMETERY BY MR BURSON BELL

shell, from one and a half to two inches in diameter, quartered with double lines, having the devices of dots between them. This kind was doubly perforated in the plane of the circle."

In "Notes on the Iroquois," by the same author, we have a much fuller description. He says that "this article is generally found in the form of an exact circle, rarely a little ovate. It has been ground down and repolished, apparently, from the conch. Its diameter varies from three-fourths of an inch to two inches; thickness, two-tenths in the center, thinning out a little towards the edges. It is doubly perforated. It is figured on the face and its reverse, with two parallel latitudinal and two longitudinal lines crossing in its center, and dividing the area into four equal parts. Its circumference is marked with an inner circle, corresponding in width to the cardinal parallels. Each division of the circle thus quartered has five circles, with a central dot. The latitudinal and longitudinal bands or fillets have each four similar circles and dots, and one in its center, making thirty-seven. The number of these circles varies, however, on various specimens."

Dr William M. Beauchamp,¹ in referring to Schoolcraft's description of this class of ornaments, says:

"The form described by Schoolcraft is usually indented at the edge, where each perforation begins, and the cross lines are sometimes omitted. The small circles and dots have no meaning, the number being regulated by the space to be occupied. They were apparently made by a small circular steel drill, having a central point. . . . The parallel holes from edge to edge served to keep the necklace flat when strung, and this feature is frequent in pipestone ornaments. . . . Beverley, in his *History of Virginia*, p. 145, calls these runtees, and says "they are made of the conch shell, as the peak is, only the shape is flat and like a cheese, and drilled edgeways."

Dr Beauchamp states also that these objects were probably made by white men, and "may be the round shells used as presents in one New York Council." With this we cannot agree, for the irregular shape of the discs found in the Minisink cemetery, in connection with the irregular ornamentation, points to aboriginal workmanship. Dr Beauchamp further states that Professor Holmes is correct in his assumption that these ornaments were

¹ Wampum and Shell Articles Used by the New York Indians, *Bulletin of the New York State Museum*, No. 41, Albany, 1901, p. 373.

beads rather than pendants, and adds that "several strings of these have been found just as they were deposited with the dead."

With two of the skeletons (7 and 30) in the cemetery, neck ornaments composed in part of these discs were found in position. With Skeleton 7 were six disc-beads, and with them twenty-one small black glass beads, two cylindrical metal beads, and one white shell bead of oval form. The glass beads were found between the discs, there being in one instance four of these and two of the metal beads in place and still adhering to the original cord. Their position showed conclusively the interval between the disc-beads, and the number of small shell beads used in alternation. Twenty-one of the glass beads were found. As twenty is the number of these required to complete the necklace, the remaining bead may have been used in connection with the white glass bead to form a pendant, or there may have been another six-bead spacing at the end of the string, which would have preserved the proper alternation of discs and beads when the necklace was in use.

The manner of wearing the disc-beads has been discussed by various authors. It is generally believed that they were used as necklaces, but the manner of stringing them differed. The finding of the necklace with Skeleton 7 enables us to determine the actual method of stringing these discoids when used in connection with smaller beads. Plate VIII, *b*, illustrates the necklace in its original form and shows the discs in actual size. The drilling is indicated, and on the edges where the perforations begin there are indentations, one at the mouth of each opening (probably due to abrasion by the small glass beads with which they were strung), giving the intervening space the appearance of a projection. The discs are thick in the center and taper toward the edge. They had been ornamented by incising, but the surfaces have disintegrated to such an extent that only traces of the decoration remain.

Six shell discs of similar size and form were found about the neck of Skeleton 30 (pl. VIII, *a*). Four of them are decorated on both faces with transverse bands crossing at the center; the other two show only slight traces of such lines. The disc shown in figure 3 is the most perfectly preserved. Both sides bear the same



A. ANTLER ARROWPOINTS AND PIECES OF WORKED ANTLER



B. TYPICAL BONE AWLS FOUND IN THE MOUND

decoration. The central square formed by the crossing of the incised bands is plain, while in each of the diverging bands there are four dots. The drilling of these discs is of the same character as that shown in the series found with Skeleton 7, but the surfaces of three of the discs with Skeleton 30 (the first, second, and fifth from the left) do not taper from the center toward the edge, while the other three taper only slightly. Intermingled with these disc-

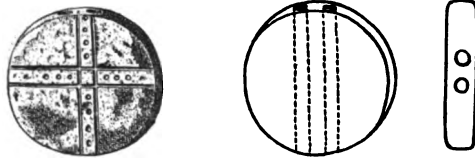


FIG. 3.—Shell disc found with Skeleton 30.

beads and occupying the spaces between them were 144 small glass trade-beads, nine ordinary white and purple wampum beads, and a cylindrical glass bead similar in size and color to the wampum. The small glass beads no doubt filled the intervals between the disc-beads, as did the glass beads forming part of the necklace with Skeleton 7. The wampum

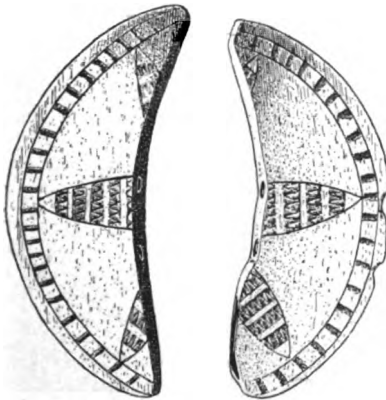


FIG. 4.—Crescent-shaped ornaments of shell found with Skeleton 29.

and the cylindrical glass bead may have formed the strand from which the bird pendant found on the breast of the skeleton was suspended. It may be seen in position in the photograph of this skeleton (pl. VII, *a*), and near it, in the shadow of the upper jaw, a badly weathered portion of a large tubular bead. The size and general form of the bird pendant is shown in figure 11. It was drilled through the neck for suspension. From

evidence afforded by more perfect specimens of similar form it is probable that the upper surface was ornamented, but decomposition of the shell has obliterated all traces of decoration.

Near the pelvis of Skeleton 29 was a shell disc-bead, identical in drilling and in uniformity of thickness with the beads found with

Skeleton 7. Near the right hand a deposit of shell and glass beads was found, also a few beads of catlinite. With this deposit were two crescent-shaped beads or pendants (fig. 4), alike in size and ornamentation, and both drilled for suspension. Here the drilling takes the form of the double perforation noted in connection with the disc-beads. The outer edge of each pendant, which forms the segment of a circle, is carefully finished, but the concave edge is irregular and crudely worked. Examination of these specimens suggested that they might have formed parts of a large gorget. The spacing of the radiating ornaments supported this belief, which was strengthened by the occurrence of the section of part of

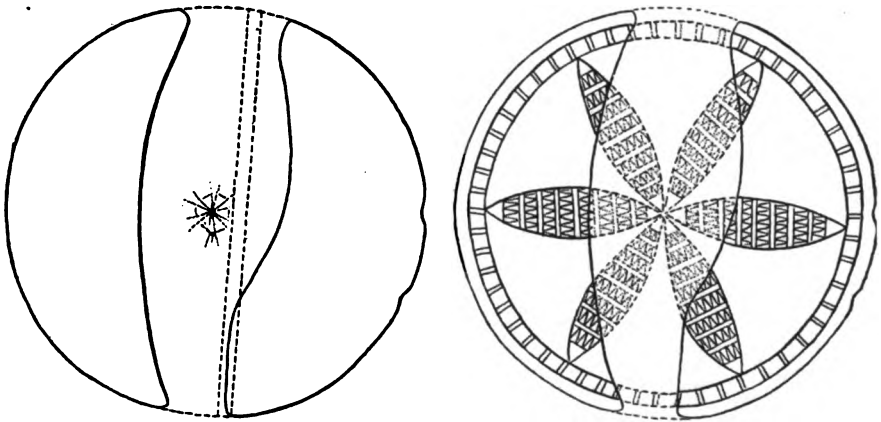
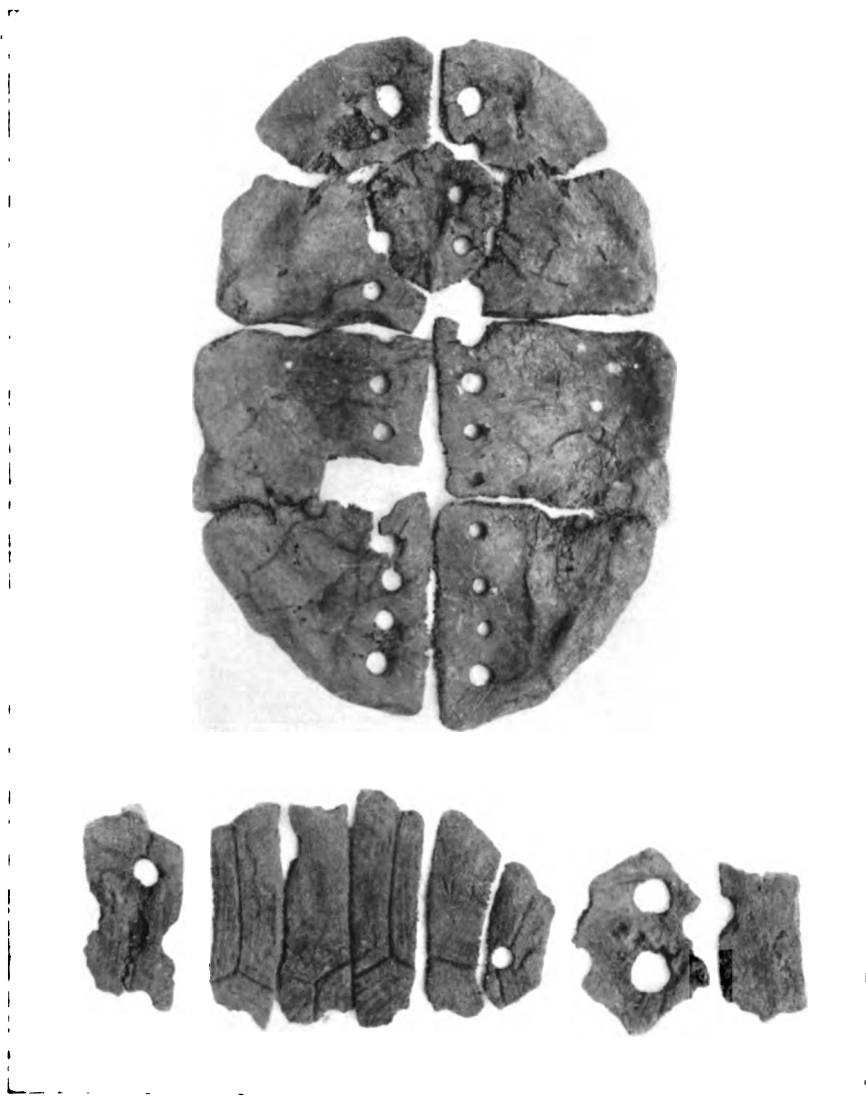


FIG. 5.—Gorget restored from crescents (fig. 4) found with Skeleton 29.

an old lateral drilling, and finally confirmed by assembling the two reworked fragments and restoring the design of the original gorget as shown in figure 5. This design is similar to that on a specimen from Pompey, New York, figured by Beauchamp, and practically duplicates the central design of the shell gorget shown in our figure 7. In figure 5 an outline of the original disc is shown, with the line of the old drilling indicated by dotted lines. From the position of this drilling, which was to one side of the center, it is probable that the disc had been doubly perforated. The crescents are practically uniform in thickness. The edges are slightly rounded from wear.

With Skeleton 26 another shell disc was found. As shown in



FRAGMENTARY TURTLESHELL RATTLE FOUND WITH SKELETON 33

figure 6 it is similar to the ones that accompanied Skeleton 7, being of the type that decreases in thickness from the center to the edge. The ornamentation is practically identical with that on the discs found with Skeleton 30, the only difference being the presence of a dot in the central square. The disc is drilled, but there is only one perforation, whereas all the others are doubly pierced. This disc was found under the lower jaw of the skeleton,

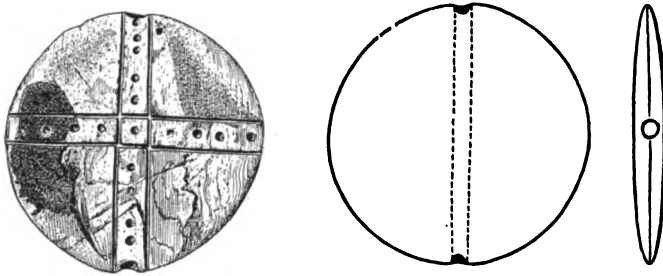


FIG. 6.—Shell disc found with Skeleton 26.

and near it was a shell ornament in the form of a fish. As no small beads were found in association, it is probable that these ornaments were used as pendants.

GORGET

The largest and most ornate of shell ornaments of the disc type found with the burials is a gorget which accompanied Skeleton 66 (fig. 7). It evidently was made from a portion of the outer wall of a conch. The design is deeply incised. The holes for suspension are drilled through the central portion, which bears an ornamentation similar to that shown in figure 5, which illustrates the restored gorget found with Skeleton 29. There are six divisions in this design, and the same number is shown in the heart-shaped figures that form the major portion of the ornamentation. As the reproduction of this object is of natural size, a detailed description of the design is unnecessary. It is, however, an unusually good specimen of a type of shell ornaments seldom found in eastern burial sites.

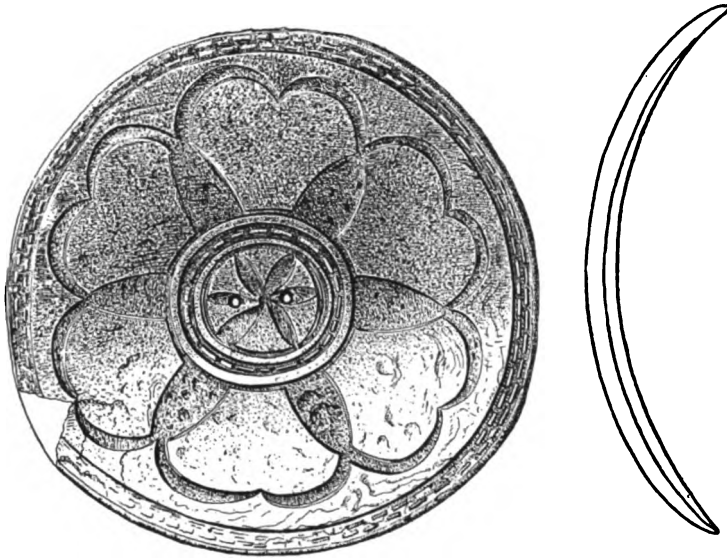


FIG. 7.—Shell gorget found with Skeleton 66.

TRIANGULAR PENDANTS

With the skeletons four triangular shell pendants were found. The largest of these (fig. 8, *a*) was under the skull of Skeleton 8. It is very thin and the surface is much disintegrated. A hole has been drilled through the upper part, but only a portion of it remains.

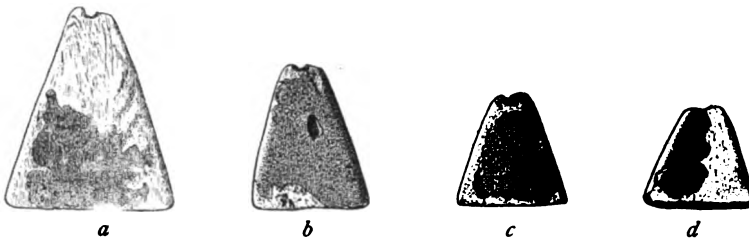


FIG. 8.—Triangular shell pendants found with Skeletons 8 and 10.

The other three triangular pendants were found under the lower jaw of Skeleton 10. In form they are similar to that first described, but the perforation for suspension is drilled through the longer axis, as shown in figure 8, *b-d*.

There is no evidence of ornamentation on any of these pendants.



POTTERY PIPES OF NATIVE WORKMANSHIP

a, b, Found with Skeleton 67. *c*, Found in Western Part of the Cemetery

BIRD FIGURES

Shell ornaments in the shape of birds are represented by ten specimens, all of which are in the form of pendants and were found with burials. Eight were taken out in the course of our work, while the other two, as previously mentioned, were found by Mr Bell. Of the ten examples six portray the body of a bird as it appears with wings folded; the other four represent the wings extended, and in each specimen the other main physical features are likewise indicated.

Figure 9 shows one of a series of six bird-shaped pendants of shell, similar in general form, found near the neck of Skeleton 36. They vary somewhat in shape and size. These shell effigies represent the owl; two of them show the eyes and the beak. There is no evidence of decoration on the body portions. The hole for the suspension of the pendants passes through the neck, and it is evident that the objects had been worn a long time, as the ends of the beads with which they were strung have abraded the sides of all of them. With these six bird pendants were 237 shell beads, and two shell pendants in the form of fish.

The bird shown in figure 10, which is rather massive and has extended wings, was found in association with small shell and glass



FIG. 9.—Shell owl figure found with Skeleton 36.



FIG. 10.—Shell bird pendant found with Skeleton 18.

beads near the neck of Skeleton 18. The breast is carved in relief, as are also the legs and the beak. The wings taper from the body to the tips, and on each side of and at the junction of the wing

and the body they are decorated with parallel lines and dots. Decomposition of the surface has obliterated the greater part of the original ornamentation, the design mentioned being the only decoration that remains. A broad, lateral groove accentuates the neck, and the perforation for the cord passes directly beneath it. The eyes are represented by small circles, each with a central dot.

The size and general form of another bird pendant are shown in figure 11; it was found with Skeleton 30 and probably had been

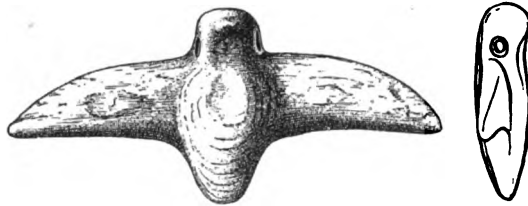


FIG. 11.—Shell bird pendant found with Skeleton 30.

attached to the necklace of shell discs and beads lying nearby. This bird is more delicately carved than the one just described. It has an oval body and scimitar-shaped wings which taper from the body outward. The raised portion forming the beak and the slight indication of the eyes are the only decorative features that remain, the surface being soft and chalky from decomposition.

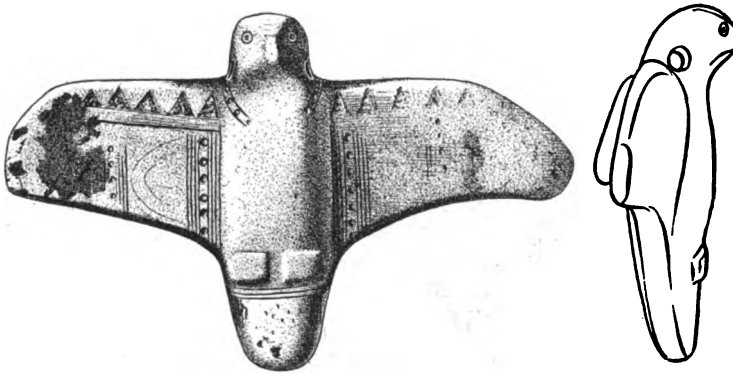


FIG. 12.—Shell bird pendant found by Mr Bell.

One of the bird figures found with the skeleton of a child by Mr Bell (pl. ix, *b*, and fig. 12) presents a surface the major portion of



PEWTER PIPES FOUND WITH THE BODIES

a, Skeleton 31. *b*, Skeleton 57. *c*, Skeleton 24

which is perfectly preserved. The figure represents a hawk or an owl. The tips of the wings and the end of the tail are discolored, and their superficial polish is gone; the tip of the beak is abraded, and a small piece has been broken from the left wing; otherwise the figure is perfect. The shell from which this bird was cut was slightly curved, the concave portion being the side that rested against the body of the wearer. The body of the figure is a rounded oval; the legs are represented by two knobs; the head is carved in the round, and the eyes are formed by circles enclosing dots. The hole for suspension passes through the neck. At the lower part of this aperture, on each side, is the end of a necklace-like band formed by parallel lines separated by a row of dots in contact. The claws of the left foot are faintly represented by a series of five dots, and there is a slight groove in a corresponding position on the right foot, but these indications are not shown in the drawing. Three deeply incised lines separate the tail from the body, and there are four incised parallel lines on each side of the tail. The upper edge of the wings is outlined by a series of triangular incisions, five on each wing, forming a serrate design. Paralleling the base of this ornamentation is a narrow line which serves as a starting point for a series of three incised bands that decorate each wing. The band nearest the body on each side is clear-cut and well preserved; it is formed by two groups of four parallel, vertical lines separated by a row of dots. This design is similar to that shown in figure 10 which illustrates a bird found with Skeleton 18.

The second bird (pl. IX, *a*, and fig. 13) suggests the figure of a kite or possibly a swallow. In the former specimen the breast of the bird was shown, whereas this one represents the back. It has broad, scimitar-like wings and a bifurcated tail. The surface is decomposed to such an extent that the physical features have almost disappeared, and only portions of the ornamentation remain. The back is formed by a raised oval area at the point where the tail and body join; the head is irregular in form, the top being rounded and projecting slightly above the level of the neck. The attitude of the figure shows that the bird is represented in flight. The hole for suspension passes through the central portion of the head.

Just above and slightly in front of the perforation openings are the eyes, represented by the usual circle surrounding a dot. The beak was below the eye-circles, but it is missing; the general contour, however, shows that it projected only slightly above the present surface. A decorative band begins below the openings of the perforation and extends across the rear of the neck; it is composed of two parallel lines separated by a row of dots, thus practically duplicating the design on the breast of the bird figure last described,

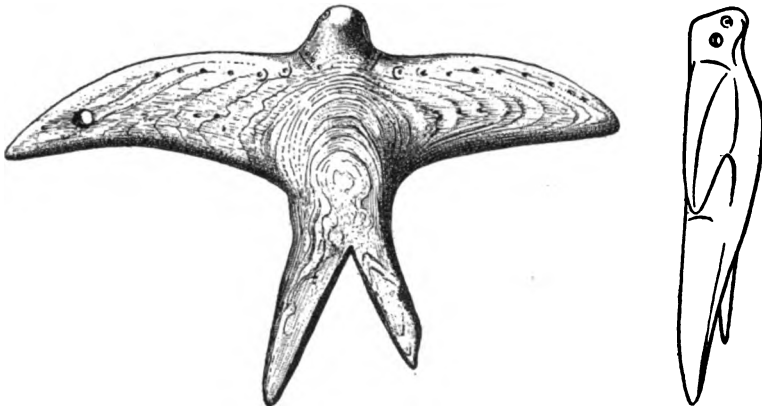


FIG. 13.—Shell bird pendant found by Mr Bell.

except that in the present specimen the dots are not in contact with the lines. Extending along the upper edge of the wings is a line of dots enclosed in small circles, and there are faint indications of another line near the central part of the wings. There is a drilled perforation near the tip of the left wing, as if to facilitate the attachment of a feather or some other symbolic object.

FISH FIGURES

Shell ornaments in the shape of fish are not uncommon in Algonquian and Iroquois burial sites. In some sections of the East they are usually crudely fashioned, but those found in the Minisink mound are uniformly well executed.

All the shell ornaments of this type from the mound were found with skeletons. There are six specimens, five representing a porpoise-like creature and the sixth a lamprey eel.



A. BRASS KETTLES FOUND WITH SKELETONS 39 AND 51



B. EUROPEAN CLAY PIPES FOUND WITH THE BODIES

The largest ornaments of this class were found with Skeleton 53; they were resting on the left scapula and had probably been the pendants of a necklace, as shell and glass beads were found near the neck of the skeleton. The best preserved specimen is shown in natural size in figure 14. The shovel-shaped nose, curved back, and the large dorsal fin give it somewhat the appearance of a porpoise or a dolphin. The tail and the dorsal, ventral, and anal fins are carved in relief. The eye is represented by a dot within a circle, and in addition to a well-defined decorative band there are traces of two other bands on the eroded portion of the shell. The figure has two holes for the passage of a suspending cord, one on each side of the dorsal fin, the lower openings being midway between the ventral and the anal fin.

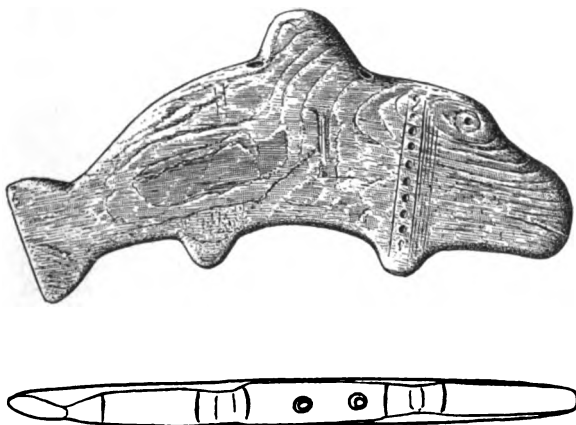


FIG. 14.—Shell pendant of fish form found with Skeleton 53.

The fish figure found with the one just described is practically a duplicate in size and form; but there are minor differences, such as the spacing of the fins and the drilling. The position of the suspension holes is the same, but on the lower surface the openings are nearer together than in the first specimen. None of the three decorative bands is well preserved, but the one near the central portion of the body, and the third, extending from the upper portion of the ventral fin to the back, are more clearly defined than the remaining one.

Another fish figure of shell (fig. 15) was found with Skeleton 10; it was lying on the neck, and with it were three triangular shell pendants and a number of glass beads. This specimen is much smaller than those found with Skeleton 53, but is of the same general form; however, it is less curved, and there is a greater relative distance between the lower fins. The drilling is the same as in the other examples, the openings being on each side of the dorsal fin. The eye is represented by a deep crescentic incision, and the mouth line also is incised.

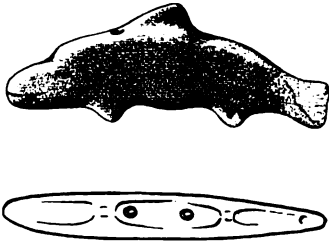


FIG. 15.—Shell pendant of fish form found with Skeleton 10.

Two very small fish carvings were found with Skeleton 36, associated with other shell pendants in the form of birds, as well as with shell beads, and were on and just below the neck of the burial. In form they are similar to the large fish figures found with Skeleton 53, and the drilling is identical, but proportionately the head is larger and the tail more slender and tapering. The surfaces of the objects are disintegrated and no trace of ornamentation remains. On one of them the dot representing the eye is still in evidence.

An unusual fish pendant was found with Skeleton 26. Figure 16 gives a top and a side view of the specimen, which probably was designed to represent a lamprey eel. The outline sketch shows the hole for suspension, also a series of lines which may be the remains of decorative bands.

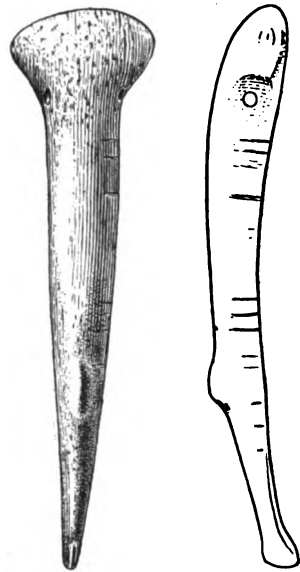
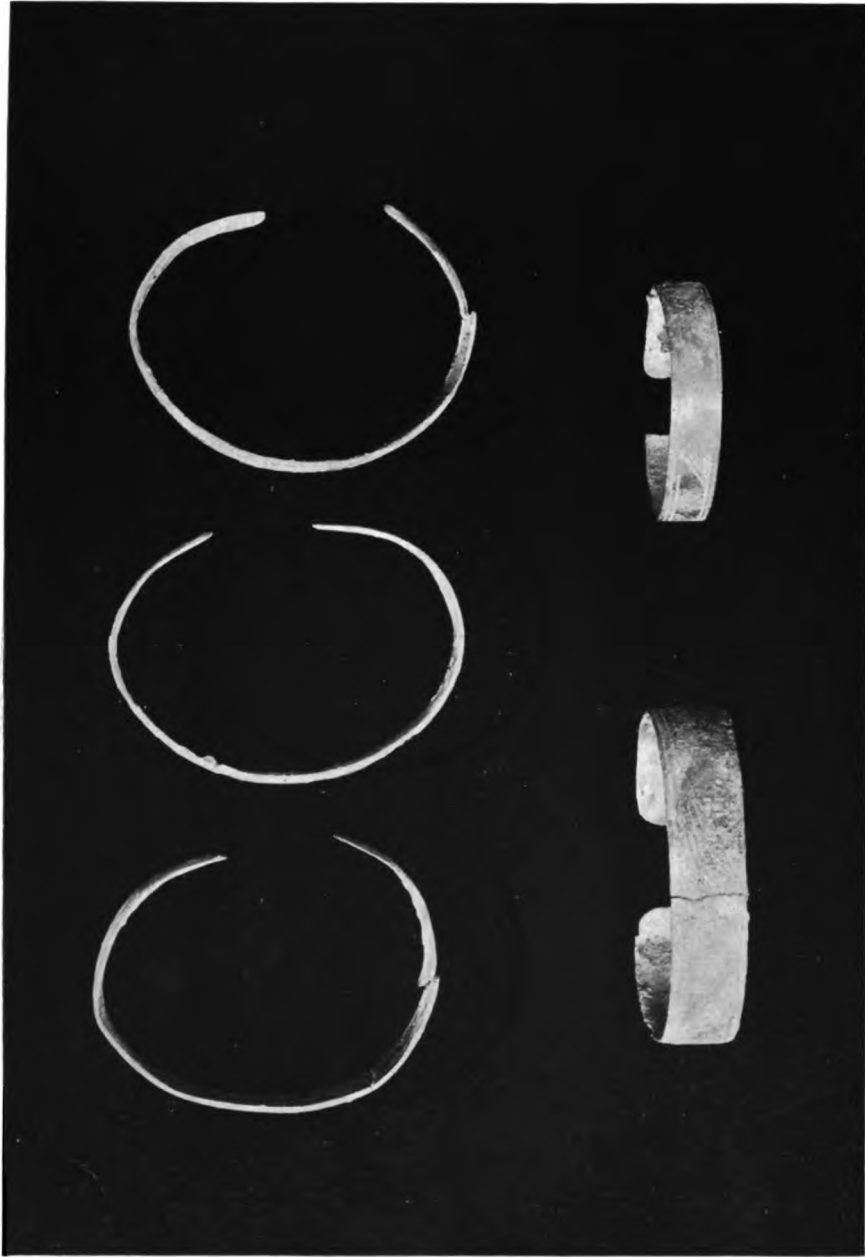


FIG. 16.—Shell figure of a lamprey eel found with Skeleton 26.

OTHER ANIMAL FORMS

A single animal figure in shell was found; it was with Skeleton 59 and represents a beaver. Figure 17 shows it in natural size, with



BRASS BRACELETS FOUND IN THE GRAVES

the missing portions indicated in outline. The body portion is very thin, but increases in thickness from the forelegs to the top of the head, as shown in the outline drawing. The under-body surface is flat, but the lower part of the head is rounded. The object is drilled for suspension, the hole passing through the neck. The upper part of the head is rounded and the eyes are represented by dots. The legs, tail, and distended sides of the body are cut in relief. Two parallel lines crossing the neck enclose three dots; this necklace-like decoration is similar to the bands that ornament the two bird figures found by Mr Bell.

BEADS

The shell beads found with the skeletons, all of aboriginal manufacture, are of five kinds, namely: typical wampum beads; long, cylindrical beads; those made of olivella shells; those spherical in form; and large disc-beads.

The disc-beads were found with Skeletons 7, 26, 29, and 30, and already have been described.

Wampum beads of the usual type were found with four of the skeletons. About the neck of Skeleton 30 were nine beads of this kind; resting on the chest of Skeleton 36 were 237, and on the cranium of Skeleton 37 there were 45. There were 130 with Skeleton 61, and, as mentioned in connection with the description of that skeleton (page 29), were lying in rows under the left shoulder, as if they had formed a belt-like object.

Cylindrical or tubular shell beads were found in six of the graves. These are of the form so readily cut from the columella of a univalve, and range in length from 1 to $4\frac{1}{8}$ in. None of them is ornamented, and in most cases the surface has disintegrated. With Skeleton 8 were five beads of this variety, associated with small glass beads in such manner as probably to have formed a necklace

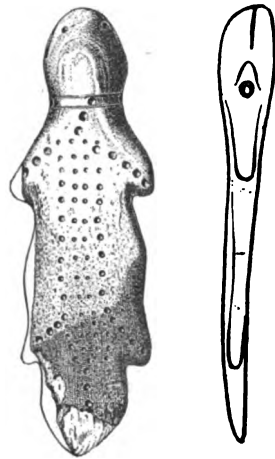


FIG. 17.—Shell pendant representing a beaver, found with Skeleton 59.

(pl. v). Under the jaw of Skeleton 17 there were nine more of this type, found in connection with a spherical shell bead and a number of glass beads. About the neck of Skeleton 18 were nine cylindrical beads and a number of glass ones. Forming part of a deposit of ornaments near the right hand of Skeleton 29 was a single bead of this type, and under the right cheek-bone of Skeleton 30 there was another, shown in plate VII, *a*. Skeleton 59 was accompanied with seven of these beads, lying near the neck.

A single spherical shell bead was found; it was lying with the tubular beads under the jaw of Skeleton 17.

With Skeleton 6 were two small beads made from olivella shells, but they are greatly disintegrated. Although this type of beads is abundant in many eastern sites, these were the only ones found in connection with the burials at Minisink.

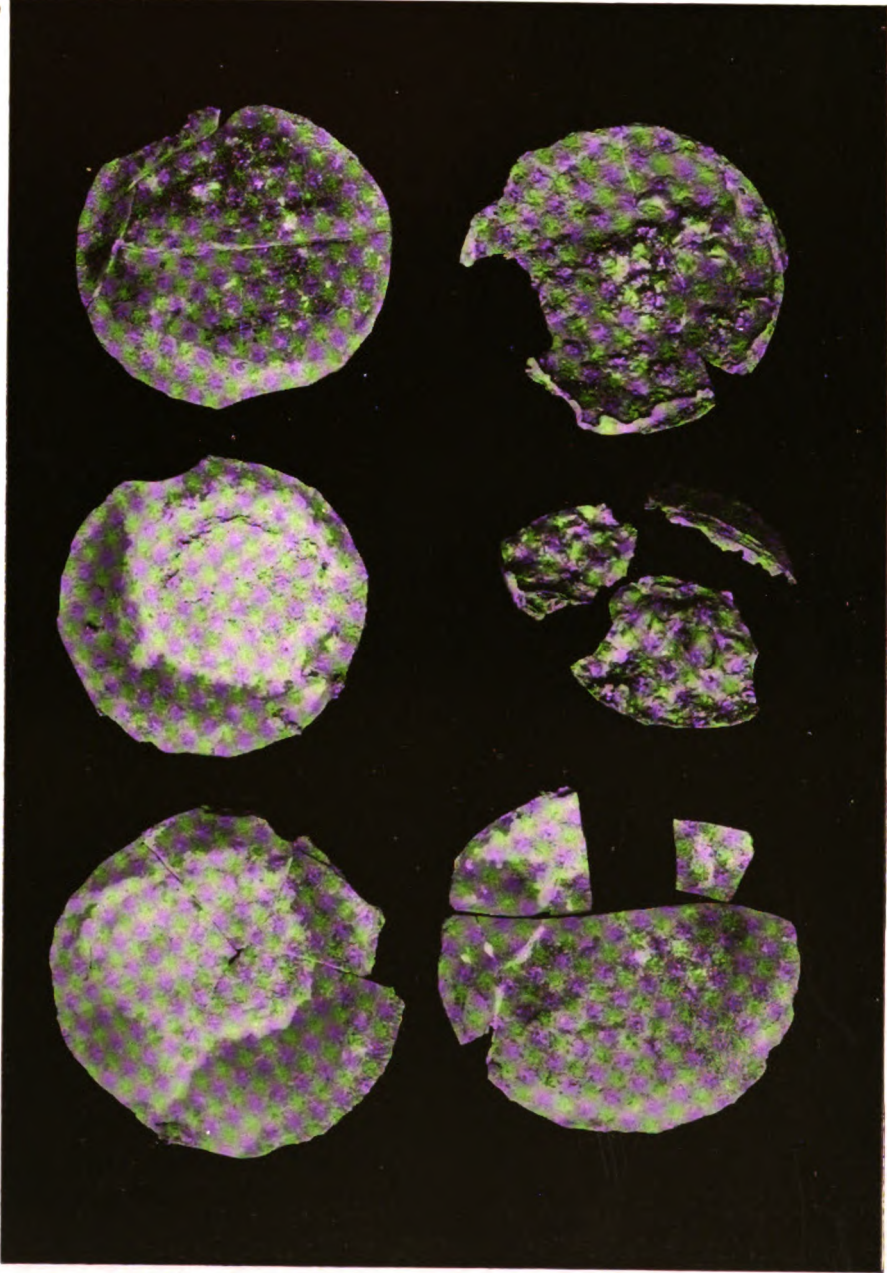
Further reference to shells and shell ornaments not in association with burials is given on page 73.

STONE IMPLEMENTS AND ORNAMENTS

Although many stone implements and a few stone ornaments were found in the feast-pits associated with the burials and elsewhere in the cemetery, few objects of stone were buried with the bodies.

No large implements were found, and the only small ones consist of ten pieces of flint, associated with Skeletons 24 and 67. Of these, three were accompanied with steel and were probably used for striking fire. Under the chin of Skeleton 6 were two small chipped pieces of black flint, and five small pieces were associated with other material near the bones of Skeleton 39. Three flat pieces of limestone were found—one, near the skull of Skeleton 6, is a fragment with disintegrated surface, the edges of which may have been worked. A similar piece rested on the chest of Skeleton 14, and another was found under the lower jaw of Skeleton 16. From the position of these stones it is evident that they had not been deposited fortuitously.

With Skeleton 33 were twenty-six small pebbles, associated with glass beads found in and about fragments of a rattle made from the



MIRRORS WITH METAL FRAMES

shell of a box-turtle. The stones had probably been used with the rattle, and the beads as ornaments.

Another evidence of the ceremonial use of stones in connection with the burials was the finding of a rock-crystal in the mouth of Skeleton 20. Owing to their attractive appearance, both in their translucency and in the beauty of their facets, and no doubt also to the mystery associated with their formation, crystals have been and still are used by many primitive peoples for ceremonial purposes, and the Munsee of Minisink were no exception, although the skeleton under consideration is that of a white man.

Practically all the beads of aboriginal manufacture deposited with the dead are of shell; a few are made of metal, but only seven stone beads were found: these are of catlinite, or red pipestone, and were found with Skeletons 29 and 53. With the former there were six, five of which were with a deposit in or near the right hand; three of them are bar-shaped, while the others are irregular in form. The sixth bead, found with a deposit of objects near the pelvis, is also of the bar type, but the edges, instead of being plain as are those of the other beads found with the skeleton, are serrated. Catlinite was used in the Middle West in prehistoric times, and through intertribal barter found its way into regions far from the aboriginal quarries in Pipestone county, Minnesota. On this subject Dr William M. Beauchamp¹ says:

A little before A.D. 1700, catlinite, or red pipestone, was brought East in small quantities, and soon became quite abundant. It assumed many forms, and was commonly delicately perforated for suspension, often having a double parallel perforation for the purpose of keeping it exactly in place.

The beads above mentioned are the only objects of catlinite found during our investigations, but among the surface finds from the immediate neighborhood there is a pipe of this material.

For reference to objects of stone not associated with burials, see pages 70-73.

¹ *Polished Stone Articles Used by the New York Aborigines*, Albany, 1897, pp. 26-27.

OBJECTS OF BONE, ANTLER, AND TURTLESHELL

Articles made of materials under this caption found with the skeletons were limited to a bone awl, a bone bodkin, an antler flaking-tool, a fragment of a turtleshell rattle, part of a turtleshell drinking-cup, two bear-teeth, and six bone tubes.

The awl, of turkey-bone (pl. x, B, *f*), was found with Skeleton 44. The end has been pointed, but the remainder is unworked. The flaking-tool, found with the same skeleton, is fashioned from a

fragment of animal bone, probably deer, and one surface of the pointed end has been abraded. As the extreme point is missing, it is impossible to say definitely whether this implement was used as a flaker or a bodkin, but the worked surface would suggest the former.

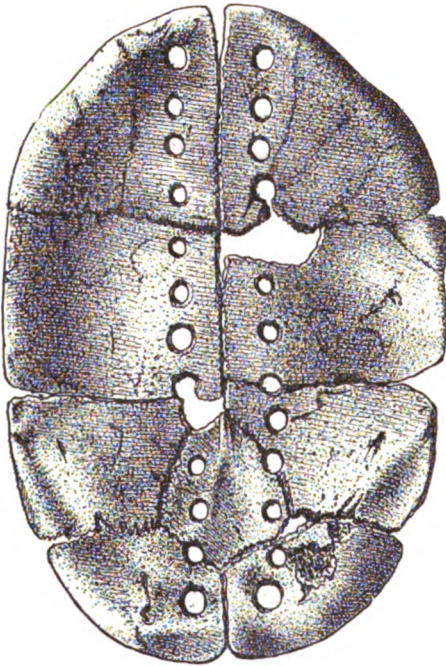


FIG. 18.—Fragment of turtleshell rattle found with Skeleton 33.

The fragments of the turtleshell rattle shown in plate XI and figure 18 was found with Skeleton 33. The carapace of the turtle is an effectual and convenient rattle-box, and together with the native gourd was no doubt among the first forms of hand rattles. The lower part of

the shell, or plastron, is almost perfect; it shows two parallel rows of holes drilled either for decoration or for the attachment of beads or other ornaments.

The fragment of the drinking-cup, above referred to, is probably a portion of the carapace of a land tortoise. Vessels of this nature



OBJECTS OF METAL FOUND IN THE MOUND

are found occasionally with burials in the eastern part of the United States, and a few unbroken ones are in museum collections. The specimen under consideration was found under Skeleton 8. The careful rounding and smoothing of the rim characterize the type of vessel of which this fragment was a part.

Canines of a bear were found with Skeletons 13 and 66. Such teeth were commonly used as ornaments, but neither of the two found with this burial is drilled for suspension or otherwise artificially worked.

The six bone tubes were found with a pewter pipe and a clay pipe, both of European make, in association with Skeleton 31. These tubes are slender bird-bones, averaging 5 in. in length. The distal and proximal portions of each have been removed and the ends carefully rounded. The surface of each specimen is smooth, but there is no evidence of ornamentation. From the size and shape of the bones it would be safe to assume that they had been used as sucking or drinking tubes. If the former, they possibly formed part of the paraphernalia of a medicine-man.

The only object of antler found with the burials is a flaking-tool which accompanied Skeleton 44. It is a short, compact, cylindrical piece of antler ($2\frac{3}{4}$ in. long, $\frac{1}{2}$ in. in diameter), and shows the effect of considerable use. It is of the type of implements used in connection with a hammer for removing the large flakes during the initial stage of chipping which followed the general roughing out of a prospective stone tool.

Reference to objects of bone and antler found dissociated from burials is given on pages 73-74.

ABORIGINAL PIPES

Only two pipes of native workmanship, both of earthenware, were found with the skeletons. This is the only noteworthy instance at Minisink in which alien objects greatly outnumbered the aboriginal artifacts. Both pipes were found with Skeleton 67, and neither is of unusual form.

As shown in plate XII, the upper specimen (*a*) exhibits a type of pipe that has been found in Iroquois sites. The major part of

the stem remains; the upper surface and the sides are flat, the under surface is rounded. The bowl is of the form of a human figure in a semi-reclining posture, the arms resting at the sides and the legs bent downward. In its present condition the pipe measures 4 in. in length.

The second pipe (pl. XII, *b*), 5 in. in length, is of the tubular variety. The stem is slender and is tubular in form. It is not decorated, but there is a line of impressed marks at the junction of the bowl and the stem. The bowl is devoid of the usual rim projection or ornament, and is without ornamentation save for a faint incised-line design on the outer surface just below the rim. The pipe is perfect with the exception that a small portion of the mouthpiece is missing.

For pipes found not in association with burials, see pages 74-75.

POTTERY VESSELS

Although makers of pottery, from the evidence offered by their burial place it would seem that the Munsee of Minisink did not use their earthenware as burial accompaniments. Of the sixty-eight skeletons exhumed, only one had pottery in association, and this was merely a fragment. The exception noted was Skeleton 60, which had on the cranium a portion of a bowl with a boat-shaped end. The exterior is paddle-marked, but there is no other evidence of decoration. Though but a fragment, it is the only evidence of a bowl-shaped vessel found in the mound.

With Skeleton II two large fragments of a jar were found, but as this skeleton had been disturbed it is probable that these sherds, like a large rim fragment found with Skeleton 8, had formed part of the refuse from a feast that had been cast into the grave.

A description of the technique of the earthenware of the Minisink site is given on pages 60-67, in connection with the discussion of the objects not associated with burials.

PIGMENTS

The only evidence of pigments found with burials was in association with Skeletons 8, 30, and 33. With the first of these, small



a



b

FRAGMENTARY ALGONQUIAN JARS

pieces of red ochre were mixed with the sand that surrounded the skull, the upper part of which was discolored by it. The crania of Skeletons 30 and 33 were each resting in a mass of red ochre, and small pieces of this material were mingled with the beads that encircled the neck of Skeleton 30.

Some of the crania and other bones were discolored by copper salts, but there was no indication of the use of paint as a means of decoration.

OBJECTS OF EUROPEAN ORIGIN

Although the first settlement of the Minisink region by white people was made during the last decade of the seventeenth century, the Munsee, living so near the coast, had been in touch with civilization from the earliest colonial times, hence it was not surprising to find various articles of foreign manufacture in the graves. Glass beads were among the first trinkets to be traded with the Indians, and many of these found their way to Minisink. In addition, there were found with the burials the following: brass kettles, bracelets, bells, a spoon, and beads; wire ornaments probably also of brass; a spoon of German silver; a copper chain; mirrors; fire-steels; pewter and clay pipes, and textile fabrics.

TRADE BEADS

The trade beads found with the bodies are all of glass, most of them black, white, or red, and such as were generally used in decorating wearing apparel as well as for necklaces. A few of these beads are spherical, and one, found with Skeleton 30, is cylindrical in form and blue-black in color. This last was found with wampum beads, and in size and shape is similar to those of native make.

Glass beads, unless of unusual type, have little value except from a historical point of view. With twelve of the sixty-eight burials glass beads were found: these were associated with Skeletons 6, 7, 8, 10, 17, 18, 29, 30, 33, 36, 51, and 53. The only beads of this kind worthy of special note were with Skeleton 17: these number eighteen and are of the form of kernels of corn. The skele-

ton with which they were found was that of a child, and these beads, with others of glass and shell, were about the neck. In making these beads both the shape and the color of the corn were imitated. Glass beads of similar character are found occasionally in association with burials in the eastern part of the United States. In the Museum of the American Indian is a series found with a burial in an Iroquois site in western New York.

PEWTER PIPES

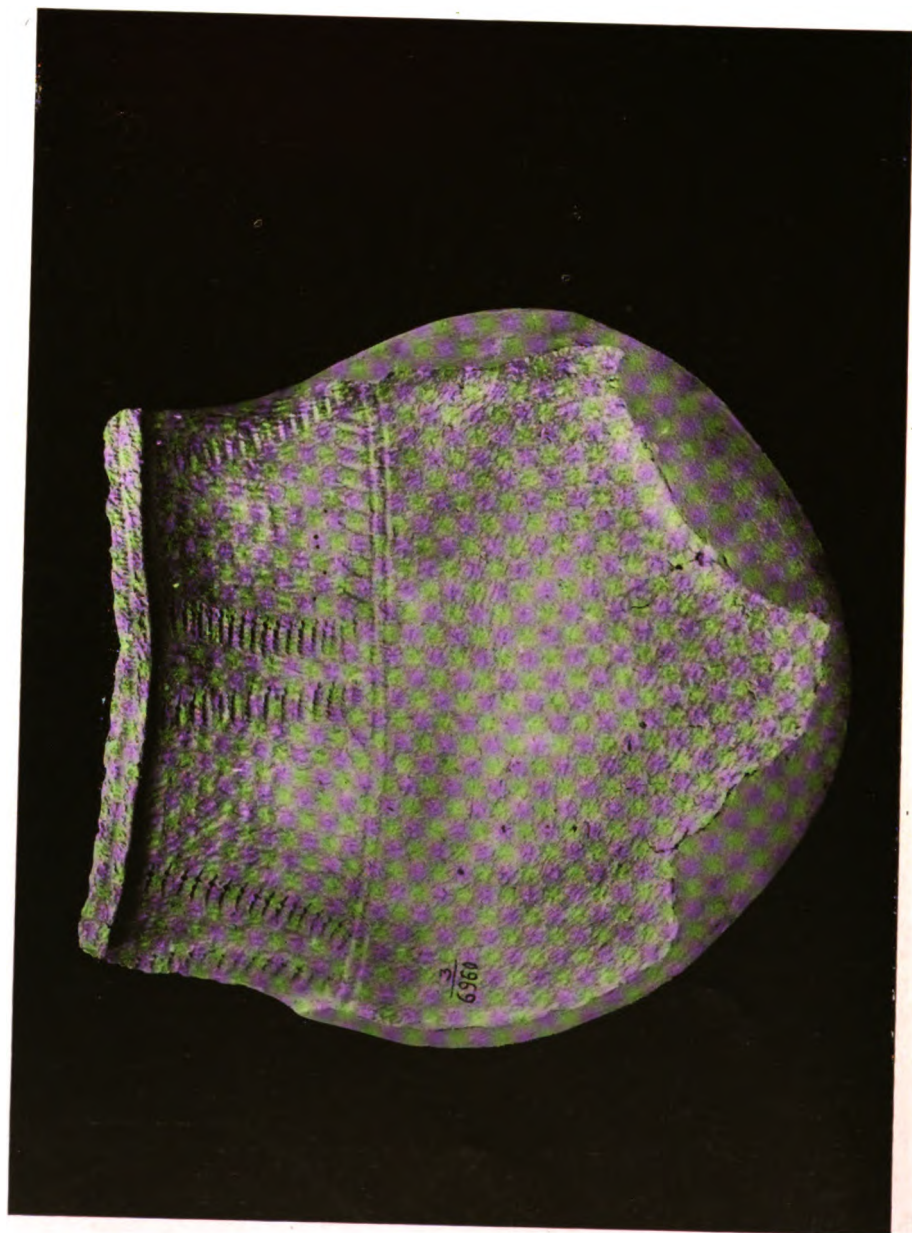
Buried with Skeletons 24, 31, and 57 were three pipes made of pewter. These were probably of European manufacture, yet it is possible that they were fashioned by the Indians. Beauchamp,¹ in writing of metallic pipes, says:

Roger Williams' statement has been given regarding the quickness with which the New England Indians learned to cast metals, even in the form of pipes. Though Hudson said he saw copper pipes in New York in 1609, none of these are known, nor are metallic pipes common. Those found on Indian sites were probably made by white men. Pewter and lead were easily melted, not so iron and brass. So bars of lead were often given to the Indians at treaties and are sometimes found on their village sites.

Comparatively little is known concerning early pewter and lead pipes among the Indians, but a sufficient number have been found to show that they were not uncommon. Beauchamp describes seven that had come under his observation to the year 1902, since which time many others undoubtedly have been found. Most of the known examples of pewter pipes are simple in form. Of the three found with the burials at Minisink, two are plain, but the third is unusually ornate.

The first pewter pipe unearthed was with Skeleton 24. As previously mentioned (page 24), it was found, with other objects, near the left shoulder, and had been broken at the point where the bowl and the stem meet. In general form this pipe (pl. XIII, c) is similar to certain early trade pipes made of clay. The bowl is irregular in form and is greatly corroded. The stem is slender and

¹ *Metallic Implements of the New York Indians*, Albany, 1902, p. 56.



FRAGMENTARY ALGONQUIAN JAR

slightly tapering, and there is no evidence of a heel at the outer base of the bowl. On the upper part of the bowl there are traces of an incised decoration, but its character cannot be determined. The length of the pipe is $4\frac{3}{4}$ in.

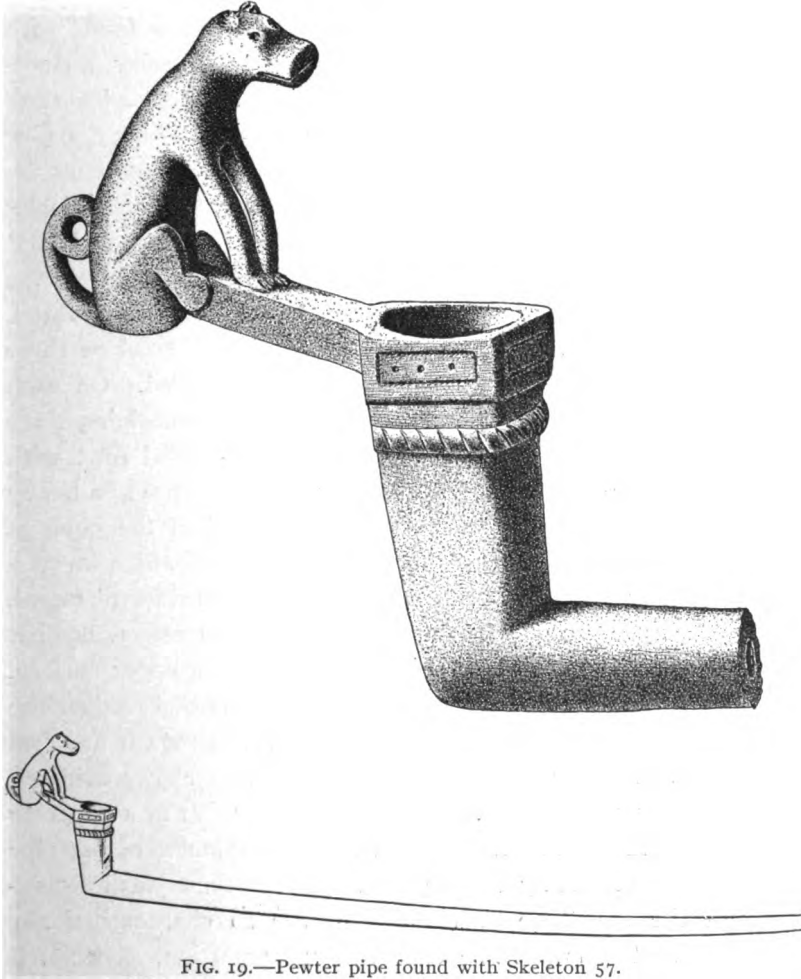


FIG. 19.—Pewter pipe found with Skeleton 57.

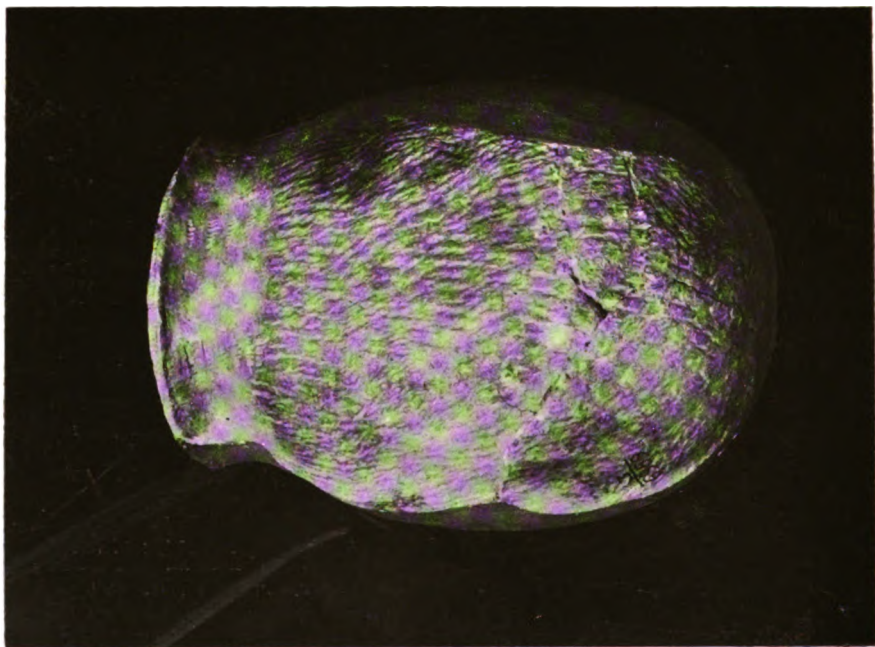
With Skeleton 31 a pipe of similar form was found (pl. XIII, *a*). It had been broken, and in the illustration (pl. VI) the stem only is shown. Like the pipe last described, its stem is slightly tapering,

but is thicker and exhibits less grace in treatment. The mouth of the bowl is oval, and the sides are rounded except the surface facing the smoker, which is flattened. At the base of the bowl there is a well-defined heel, but there is no property mark and no trace of decoration. The length is $4\frac{3}{4}$ in.

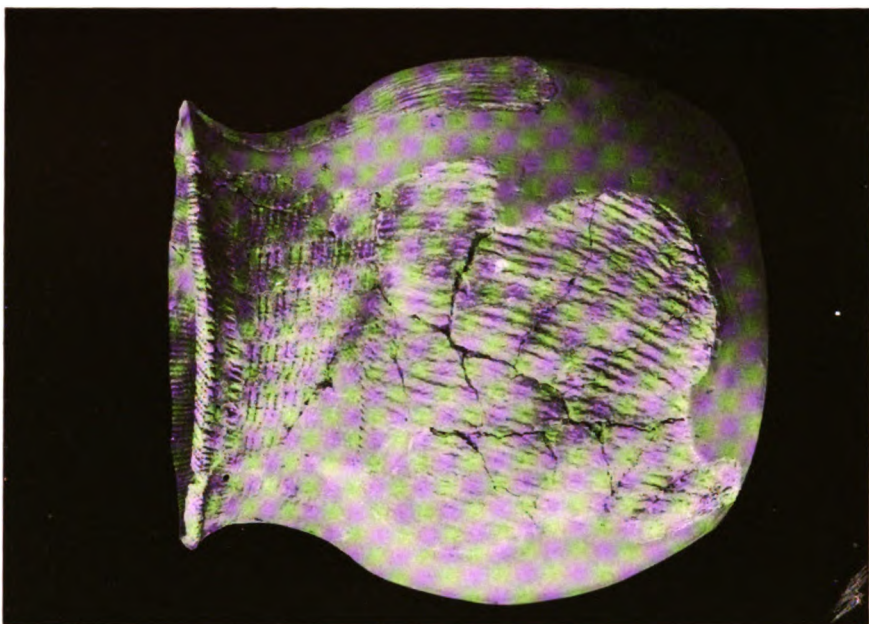
The most elaborate of the three pewter pipes was found with Skeleton 57 (pl. XIII, *b*). It has a long, slender, tapering, undecorated stem, and a highly ornamental bowl. The extreme length of the pipe is 18 in. (fig. 19). The stem was broken when the pipe was found, but, unlike the other two, the break occurred near the mouth end. The bowl joins the stem almost at a right angle; there is, however, a slight distal inclination. The sides and that portion of the bowl facing the smoker are slightly bulging; the rear surface is flat. The lower part of the bowl is not decorated, and there is no heel. Encircling the mouth of the bowl on three sides is a frieze, the lower edge of which is squared. On each face of this frieze there is an incised quadrangle containing three impressed dots. Below the frieze there is a rounded fillet with equidistant oblique incisions that give it the appearance of a heavy cord. Projecting from the posterior of the bowl of the pipe, at the surface of the rim, is a platform-like projection which forms a support for an animal figure, a wolf¹ or a dog, molded in the round. It is represented in a sitting posture, the hind feet resting against the sides of the support, and the front feet on its upper surface. The back of the figurine is rounded; the tail is curled against the lower part of the back; and the eyes, ears, and mouth are well represented. Neither the animal nor its support shows evidence of having been ornamented. There is no indication of a property or a manufacturer's mark, but from the elaborateness of the pipe it was probably made by a white man, although the style of decoration and the technique of the animal are so characteristically aboriginal that it is possible that Indian suggestion, at least, is responsible for this unusually ornate object from the Minisink site.

No other pipe of this form has been seen by the writers, but a

¹ It may here be mentioned that the Munsee were known also as the "Wolf tribe of the Delawares," a fact that suggests the employment of the wolf totem as a symbolic device.



a



b

FRAGMENTARY ALGONQUIAN JARS

less elaborate though allied example is described and figured by Beauchamp in the publication (p. 57) previously quoted. He says: "Fig. 127 is a curious angular lead pipe in the State Museum, with a bold platform projection in front of the top of the bowl. This was obtained by Mr J. S. Twining in Jefferson County." The accompanying illustration shows an unembellished platform projecting from the bowl, the point of juncture being below the frieze, which in this specimen is composed of encircling lines. The type is such an unusual one that it is interesting to note the main point of similarity. Whether there is evidence of the former existence of a figure at the end of the platform, the writer does not state.

In summing up the evidence presented by these pewter pipes it would seem that the two simple forms may probably be the product of Indian handicraft, while the third example was more likely the work of a white man.

Although the surfaces of all the pewter pipes are somewhat corroded, the alloy is well preserved and is not easily broken, a fact that precludes the probability of breakage after burial. It would therefore seem that the "killing" of objects deposited with the dead, a custom often practised by aboriginal tribes, had likewise been employed in this instance, and that the "spirit" of the pipe was thus liberated to accompany its owner to the future world.

In answer to an inquiry concerning pewter pipes, Mr Arthur C. Parker, State Archeologist of New York, writes as follows:

We have at least six pewter or lead pipes similar to the one you mention and several were destroyed in the Capitol fire some years ago. All of these pipes seem to have been cast by Europeans and not a few are modelled after the conventional clay pipe, although the stem is thicker. One or two pipes that were destroyed by the fire had upon the projected lip piece the effigy of some animal, I do not remember whether bear or wolf. This platform with effigy seemed to have been cast with the pipe. In the case of the pipe which you refer to in your letter, there seems to have been some animal effigy. This specimen was destroyed in the fire. The illustration in Beauchamp is correct, if I remember rightly. All of the pewter pipes in our collection are from Iroquoian sites of the middle and late colonial periods, that is to say from 1650 to 1687 and

1687 to perhaps 1755. In later sites brass pipes have been found to the exclusion of the pewter pipes.

In the *Fourth Annual Report of the Canadian Institute*¹ a pipe is figured and thus described:

The production of a pewter pipe like the above leaves no doubt as to European influence. The animal is probably meant to represent a bear. This pipe was found near the village of Scotland in Brant county. The only other pewter pipe in our collection came from the Bay of Quinte, where it was found some feet deep in the water.

This pipe is practically identical with that found with Skeleton 57. From the drawing it would seem that it has the same proportions and the same general shape. It is about one foot long, has the same slender type of stem, the bowl is placed at the same angle, a frieze encircles the edge of the bowl, and a projection rises from its upper distal surface. Instead of a dog or a wolf, as represented on the platform of the Minisink specimen, the Canadian pipe has the figure of what seems to be a bear—in a standing position with the head toward the bowl-opening.

OTHER METAL OBJECTS

Metal objects of European origin were found with thirteen of the burials, namely, Nos. 7, 8, 24, 29, 31, 39, 51, 53, 57, 58, 59, 66, and 67.

Spun-brass kettles were buried with Skeletons 39 and 51. The one found with the former skeleton was resting on the skull; it is 8 in. in diameter at the rim, and $3\frac{1}{2}$ in. deep. This kettle is perfect, with the exception of the iron bale, which had fallen apart through corrosion. The kettle found with Skeleton 51 was near the left side; it is 4 in. in diameter at the rim and $2\frac{1}{4}$ in. deep. The bottom is broken and some pieces are missing, but the bale and attachments are intact. Its rim contains a core of iron. These specimens are shown in plate XIV, A.

Four brass bracelets, besides fragments of others, found with Skeleton 53, are probably of European manufacture. The decora-

¹ Toronto, 1891, p. 67, fig. 161.



ALGONQUIAN JAR

tion is in the form of bands of oblique lines, as shown in plate xv and figure 20. The small bracelet shown in the same plate was found in a grave by Mr. Bell.

Small glass mirrors in metal frames were found with Skeletons 24 and 39. Typical examples of these are shown in plate xvi.

Two small brass bells, half an inch in diameter, were with Skeleton 29, and with the same burial was a spoon of German silver or white metal (pl. xvii). With Skeleton 58 were pieces of fused metal; with Skeleton 59 a chain of copper (pl. xvii), and with Skeleton 66, pieces of folded sheet-metal. Accompanying Skeleton 8 was a rather elaborate wire ornament, probably of brass, only portions of which remained; it is shown, together with other objects, in plate v, and the individual wire coils are illustrated in plate xvii. Pieces



FIG. 20.—Bracelet found with Skeleton 53.

of metal found in connection with small flints were with Skeletons 24 and 67, but were corroded to such an extent that their original form could not be determined; they evidently were used, however, for striking fire. Small copper beads, no larger than the usual wampum beads, were buried with Skeletons 7 and 53. It is possible that they are of native make, but it is more likely that, together with the glass beads used with them, they were obtained by the Indians from early settlers.

The finding of the bowl of a brass spoon, not associated with a burial, is referred to in another place (page 75).

CLAY PIPES

It would be natural for one to assume that the finding of European pipes bearing the makers' marks would facilitate the explorer in his endeavor to determine the age of the burials with which they were found, but after affording proof that the burials are post-Columbian, their value in determining chronology practically ceases, for there is little definite knowledge concerning pipe-makers or the time of the introduction of the product of their manufacture.

Beauchamp,¹ in prefacing his remarks concerning clay trade-pipes, says:

Precisely when European pipes began to be used by the New York Indians, we may not be able to decide. Large white stems, carved as ornaments, appear on the Onondaga site of 1654, but this was occupied for some years longer. No Dutch pipes have been found, known as such, and it is not likely that English pipes would have been introduced inland, till the English took and retained possession of the province of New York. On some sites of the last quarter of the 17th century, such pipes have been found. As public gifts to the Indians they first appear in a council held in 1692, but some may have been given before. The older ones have the bowl rather small and barrel-shaped, and the makers' initials may appear on the projecting heel below the bowl.

Six European clay pipes (pl. XIV, B) were found with the burials, of which two were with Skeleton 6. One of these (*e*), in perfect condition, has a long, tapering stem and the usual inclining bowl. On the inner edge of the rim, above the stem, there is an impressed line. Impressed in the proximal face of the bowl are the letters R T. The second pipe (*a*) is practically a duplicate of the first; it is provided with a band below the rim and with the same letters on the face of the bowl, but part of the stem is missing. Both pipes afford indication of having been smoked.

The third pipe (*b*) was found with Skeleton 31. The bowl is almost perfect, but the stem is broken. The heel at the base of the bowl is stamped with a circle containing the letters E B, and an impressed line encircles the bowl just below the rim. This pipe shows no sign of having been used.

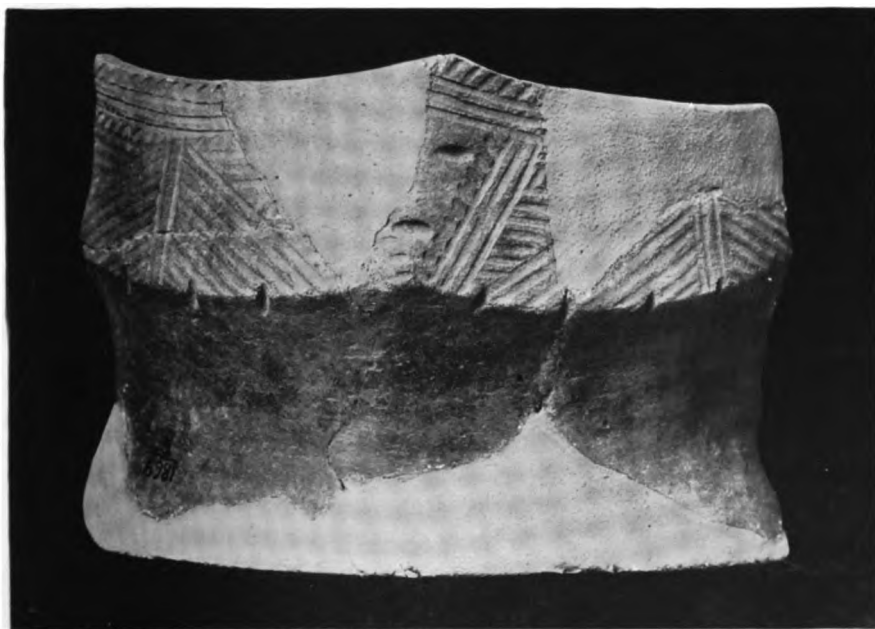
Another clay pipe (*d*) was found near the left shoulder of Skeleton 24. The stem had been broken while in use, and there are indentations made by the teeth of the user. It has no heel, and there is no maker's mark. There is an impressed line on the proximal edge of the rim, and the inner part of the bowl is blackened from continued use.

Two pipes (*c*, *f*) were found near the right shoulder of Skeleton 39; both have broken stems, but the bowls are perfect. Each

¹ "Earthenware of the New York Aborigines," *Bulletin of the New York State Museum*, Albany, 1898, p. 115.



a



FRAGMENTS OF JARS OF IROQUOIS TYPE

has an impressed encircling line below the rim, and a heel at the base of the bowl. On the heel of one (*c*) are the letters \overline{P} , and on the heel of the other (*f*) the letters E B. Both have been used.

In considering the makers' marks, we find two pipes marked R T. McGuire,¹ in speaking of this maker's stamp, says: "Dr E. A. Barber refers to a trade pipe with the initials R. T. on its heel, which was found in an Indian grave in Chester County, Pennsylvania, probably the manufacture of one Richard Taylor, of Bath, England; and another was found in Lancaster County, Pennsylvania." The pipes under consideration have the R T on the bowl and were probably Tippet pipes. Edwin A. Barber,² in a catalogue of pipes, describes three examples marked on the bowl in a similar way. The first of these he describes as: "Old British (?) Pipe; mark R T, impressed in back of bowl, and R. Tippet raised in circle on right side. From Indian Grave, Chester Co., Pa." and "Old British (?) Pipe; same form as No. 2 (the one just described) mark R T in back of bowl. From Montgomery Co., N. Y." In this instance R Tippet on the side was evidently omitted, for in Barber's description of the third pipe he mentions both marks.

No unbroken clay trade-pipes were found except in connection with the burials. Five fragments of stems, however, which had no association with skeletons, were unearthed; these may possibly have served as beads.

TEXTILES

Although the bone and shell objects were in a fair state of preservation, no objects of wood were found, and only three examples of textile fabrics, which were found with Skeletons 39 and 53. With the former were several objects of European manufacture, including a brass kettle, clay pipes, mirrors, and brass bracelets. The bale of the kettle was of iron, which had been broken into a number of pieces through corrosion; the core of the rim is also of iron. To one of the bale fragments a piece of cloth was attached,

¹ *Pipes and Smoking Customs of the American Aborigines*, Washington, 1899, p. 449.

² *Catalogue of the Collection of Tobacco Pipes Deposited by Edwin A. Barber, The Pennsylvania Museum and School of Industrial Art, Philadelphia, 1882.*

the oxidization of the iron having preserved it. This fabric is closely woven and has the appearance of colonial homespun, which it probably is.

Skeleton 53 was that of an adult, with which four brass bracelets and fragments of others were found. Attached to two of the fragments were small pieces of cloth of two different weaves. Owing to the fineness of the warp and woof strands there is little doubt that these fabrics were derived from Europeans.

URN BURIALS

The somewhat unusual practice of covering the head of a human body with a vessel, a custom commonly known as "urn burial," was manifest in two graves in the Minisink cemetery.

Skeleton 39 lay on its back with the head resting on the occiput. The kettle, as shown in plate XIV, A, was found bottom upward, with the rim resting on the frontal bone of the skull (pl. VII, *b*). From its position it would seem that, with the decaying of the wrappings about the head, the kettle had gradually slipped to one side.

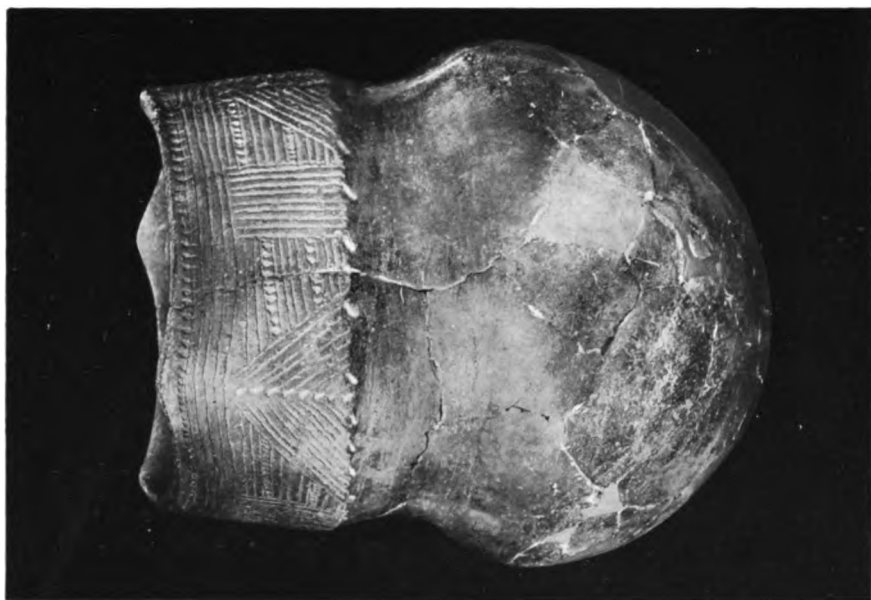
Skeleton 60 was lying in the same position as the one just described, and on its head rested a fragment of an earthenware bowl, 3 in. in depth. Strange to say, this was the only sherd of a bowl found with a burial.

In connection with the subject of "urn-burials" the reader is referred to the section treating of Pits Containing Jars (pages 67-70).

FEAST-PITS

In the descriptions of the burials mention is made of feast-pits and the remains of feasts as represented by animal bones (many of which had been broken, evidently for the purpose of extracting the marrow), bird bones, shells, etc. In many instances the disturbed area was merely an extension of the grave itself, showing that the refuse from the feast had been either deposited near the body or mingled with the earth with which the remains were covered.

In some instances were found so-called "pits" a short distance from the burial. In one case, for example, the edge of such a pit was three feet from the nearest edge of the grave of Skeleton 6.



a



b

(a) JAR AND (b) FRAGMENT OF A JAR OF IROQUOIS TYPE

This pit contained nine small, carefully worked net-sinkers, not grouped but scattered through the soil at an average depth of 18 in. The pit also contained animal bones, potsherds, and charcoal, and in all respects was similar to the feast-pits associated with the burials. Whether this pit had been used in connection with the ceremonies performed for the burial represented by Skeleton 6 cannot be stated. This is not an isolated case, as there were several similar pits, but their relation to nearby burials could not be determined.

Feast-pits and the remains of feasts deposited with burials are of common occurrence in connection with graves in this general region, suggesting the performance of a feast ceremony as part of the mortuary rites.

DOG BURIALS

The skeletons of two dogs were found in the cemetery. The first, unearthened at a point twelve feet southwest of Skeleton 6, was lying on its side, with the head toward the NE. A worked stone, a few potsherds, and a freshwater clam shell were found with it. About a foot west of this skeleton and in the same disturbed area were a number of large stones—one a lap-stone, another a grinding stone. This dog skeleton was not associated with a human burial, and all evidence pointed to the conclusion that it had been buried in pursuance of some ceremonial rite. Certain portions of the skeleton were missing, but from its general appearance it would seem that no part of the dog had been consumed in a feast.

The second dog skeleton was found between Skeletons 13 and 17, two feet below the surface. The bones were surrounded by pieces of charcoal and deer-bones, the latter having been cracked evidently for the purpose of extracting the marrow. Judging by the appearance of the dog bones, which were massed, and from the fact that many of them were missing, the dog had probably formed part of the food used in a feast. No implements were found with the burial. In the East, dog burials in connection with human interments are not uncommon, and they are not unknown in the West.

OBJECTS NOT ASSOCIATED WITH BURIALS

POTTERY

The preliminary investigations in connection with the Minisink burial site showed that many objects of aboriginal manufacture had been turned up by the plow, and, as before stated, fragments of human skeletons were found on the surface. It therefore is probable that some of the objects found in the general excavation of the mound had been deposited originally with the dead. A case in point is that of the finding, on the surface, of fragments of tubular shell beads associated with portions of a human skull—the beads had been broken into pieces and the bones had been bleached by the sun, but their finding showed that bodies with their accompanying ornaments and implements had been brought to the surface, and as the spot for years has been a favorite hunting ground for collectors, many specimens had been carried away.

Many of the artifacts found not in direct association with burials were in groups, some of which, however, were more or less near burials, others some distance from them. Those deposits found in connection with feast-pits are treated in detail under a separate heading (pages 67–70).

At the present time a satisfactory comparative study of the ceramic arts of the area under consideration is not possible, owing largely to dearth of material. That two well-defined types of pottery are represented at the Minisink site, however, cannot be questioned. A few specimens present characters common to both types and may be the result of association of two distinct aboriginal groups of people, but we are not able to determine whether the Iroquois type of pottery represents a post-conquest period, when the arts of the victors were forced upon the conquered, or whether they were Algonquian merely by ownership through the medium of trade.

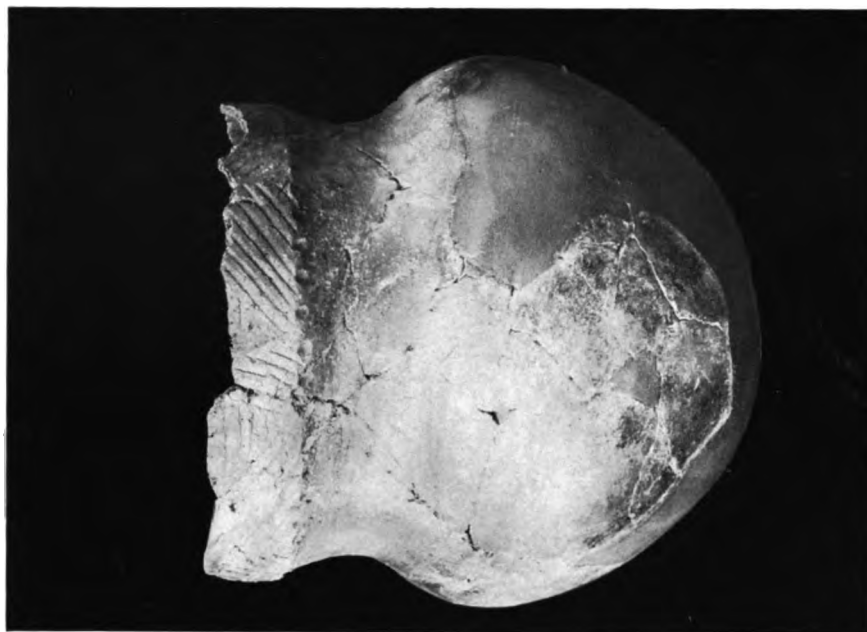
In considering the pottery of the Eastern Indians, Professor Holmes¹ says:

To exactly what extent the Algonquian tribes are responsible for the northern types of pottery, aside from those definitely assignable to the

¹ *Aboriginal Pottery of the Eastern United States, Twentieth Ann. Rep. Bur. Amer. Ethnol.*, p. 146.



a



b

a, JAR OF IROQUOIS TYPE FOUND ON SOUTHERN SHORE OF MINISINK ISLAND (PRESENTED BY MR RANDALL D. SAYRE). b, FRAGMENTARY JAR

Iroquois, may never be fully determined, but that these types are largely Algonquian may be assumed from the historic occupation of many sections by pottery-making communities of that family.

General historic and specific documentary evidence proves that the Delawares occupied the section of New Jersey under consideration for a long period, perhaps centuries. From the earliest times it was known as a Delaware stronghold, and it was held by them until the early part of the eighteenth century. The identity of the Algonquian forms is thereby assured, but with reference to the Iroquois ware only a personal opinion can be advanced. The main points of difference lie in the form and the ornamentation; the general technique presents peculiarities that are opposed to the technique of the Delawares. Cushing's comparison¹ is concise and pertinent:

The pottery of the northeastern Algonquian tribes at least is, if I may judge from examples I have seen in New England (and even from Virginia), relatively deeper, more conical, relatively narrower at the shoulders than at the rim, more decorated with cord-, net- or textile-impressed or stamped markings than with straight-lined incisions, and, above all, is more generally characterized by a shell tempering than is the inland pottery of the Iroquoian tribes.

The greater number of vessels found in the mound were in fragmentary condition. Only one perfect jar was unearthed, and this, with a similar one from the shore of Minisink island, near the mound, are the only complete examples of ceramic art obtained from this region. Owing to the fact that many of the vessels were practically complete, the missing portions have been restored, but wherever restoration has been made, the plaster has been given a neutral tint, no attempt being made to reproduce the original color of the vessel. This has enabled us to present a series of plates which afford a comprehensive idea of the various forms, embellishments, and decorative designs of the earthenware of the Minisink area.

Forty-one fragmentary vessels, representing three types of

¹ F. H. Cushing, *The Germ of Shoreland Pottery*, *Memoirs of the International Congress of Anthropology*, Chicago, 1894, p. 232.

pottery, have been restored. These types show the vessels of probable Algonquian origin, of Iroquois origin, and a few that seem to combine technique common to both types. In the accompanying plates six of the first type, seven of the second, and one of the third are shown. The remaining twenty-seven vessels, which are not illustrated herein, represent twelve of the Algonquian type, twelve of the Iroquois, and three showing a combination of the two.

The following descriptions of vessels selected for illustration present the principal features that characterize each group.

EARTHENWARE OF ALGONQUIAN TYPE

In plate XVIII, *a*, is shown a fragment of the rim of a jar of fine texture, the surface of which evinces the care and skill employed in the levigation, mixing, and manipulation of the paste, in the selection and proper addition of the tempering medium, and in the preliminary drying of the vessel and the subsequent firing. The surface was carefully smoothed and semi-polished after the addition of the final slip in preparation for the application of the design. The decorative element consists of a series of small, uniform indents or punctures, applied with a dentate wheel, each tooth of which had been delicately pointed. So skilfully was the ornamentation applied that its effect is highly esthetic. The rim is narrow and outcurving, and the lip and inner surface are covered by a continuation of the body design. This specimen is the best example of Algonquian fictile work that the mound produced.

A portion of the rim and side of a large jar is shown in plate XIX. The body is paddle-marked, resulting in a uniform mottled surface. The neck has been smoothed, but between it and the body there is no shoulder. At the point where the recurving of the neck portion begins there is an encircling band formed by two impressed lines. The neck is broad and is spanned by six angular impressed lines, arranged in pairs, extending from the encircling band to the lip of the rim.

The next specimen to be considered is half of a symmetrical jar with gently tapering sides. It is a typical example of the small,



a



b

(a) PERFECT JAR, AND (b) FRAGMENTARY JAR OF IROQUOIS TYPE

undecorated cooking vessels (pl. xx, *a*). The body is covered with textile or cord-wrapped paddle-marks, the neck has a series of wheel-marks applied horizontally, and the lip is ornamented with an impressed line evidently applied with a similar tool. Height 6 in.; diameter $4\frac{1}{4}$ in.

Another typical jar of Algonquian manufacture is shown in plate xxi. It has tapering sides and is rounded below. A portion of one side and part of the rim are missing. The body surface is covered with deeply malleated paddle-marks, which also originally covered the neck, but the latter area has been smoothed, thereby practically obliterating the ornamentation. The rim is narrow and has a deeply cut, cross-hatched design evidently made with a sharp scarifying tool. The lip of the jar is plain. Height $8\frac{1}{2}$ in.; diameter $7\frac{1}{4}$ in.

A large fragmentary jar, the rim of which is practically complete, is shown in plate xx, *b*. It is of the heavy, thick-walled type, and the body is covered with a deeply impressed ornamentation made with a cord-wrapped paddle. The neck is covered with a design made probably with a cord-wrapped rouletting implement; the base is margined with an encircling band of wheel impressions, and there is a similar band at the upper edge. The lip of this vessel is sloping and is decorated with rouletting which extends to a depth of an inch on the inner portion of the rim. Diameter of rim, $9\frac{3}{4}$ in.

Another fragment of a large vessel is represented by the upper portion of a jar, including part of the rim (pl. xviii, *b*). The body is covered with a cross-hatching of cording or other textile applied by paddling; the lines thus made are finer than any displayed by the other jars. At the depression of the shoulder and separating the body design from that of the neck is an encircling band of round punctate marks. The neck ornamentation consists of horizontal cord-markings margined on its upper part by a series of oblique cord-lines which cover the space between the main design and the outer edge of the lip. The sloping lip is ornamented with a single encircling cord-line, and the inner part of the rim is cord-rouletted. Diameter of rim, $9\frac{3}{4}$ in.

EARTHENWARE OF IROQUOIS TYPE

The Iroquois type of earthenware is characterized by a smooth body surface, devoid of paddle-marks; it is usually undecorated, and as a rule has one or more rim-projections. The clay is tempered with sand or other material, finely ground, which accounts for the fine texture as compared with the majority of Algonquian vessels with their coarse shell-tempering. Many of the Iroquois vessels are finished by means of a polishing stone or other object that imparted the required smoothness.

The following descriptions, with the accompanying plates, give an idea of the character of the vessels of this type found in the mound.

Plate XXII, *b*, shows a fragment of a typical rim of an Iroquois vessel on the lip of which is a single upward projection. The jar is of the type that has the angles of the frieze emphasized by ornaments in the form of conventional human faces; this frieze is very broad, and the angle underlying the projection referred to shows one eye and the mouth of such a face. The spaces between the angles are filled with a pattern composed of angular lines and dots, and at the point where the rim joins the neck there is an encircling series of short, deep incisions. The walls of this jar are relatively thin and the ware is light in color.

Another example of human-face ornamentation is illustrated by a fragment of the rim and side of a typical Iroquois jar with plain body as shown in plate XXIII, *b*. It has an abrupt shoulder, and the neck is concave. One lip-projection is shown, and the space below it, a portion of the frieze, is emphasized by a conventionalized human face, on each side of which is a design formed of oblique and horizontal lines, the latter bordered with punctate markings. On the projection of the lip, already referred to, directly above the face on the frieze, is a second face, similar in form and flanked with incised lines.

A typical Iroquois jar (pl. XXIV, *a*) was presented by Mr. Randall D. Sayre, of Milford, Pa., by whom it was found on the southern shore of Minisink island directly opposite the Minisink cemetery. The vessel was practically perfect when found, but while in the



FRAGMENTARY JAR SHOWING A COMBINATION OF ALGONQUIAN AND IROQUOIS TYPES

possession of its original owner it was accidentally broken. The jar is of the typical globular form; the body is symmetrical and the surface smoothly finished. A line of short, slanting incisions encircles the base of the neck. The lip-projections were large and rounded, and there was a pronounced rim depression between them. One side of the rim is missing, but there can be no doubt that it belonged to the "two-point" type. The main portion of the frieze is decorated with oblique incisions, and above this encircling band there is a series of irregular, horizontal lines. Height 7 in.; diameter $6\frac{1}{2}$ in.

Plate xxv, *a*, illustrates the only perfect jar found in the mound; it is a symmetrical vessel of the "four-point" type, and has an elaborately decorated frieze, an incurved neck, and a body that tapers gracefully from the shoulder to the semi-conic base. The surface of the body is smooth, and in its entirety the jar is a good example of Iroquois ornate earthenware. The top of the vessel is squarish, but instead of the angle projections usual in receptacles of this class, there are two almost level sides, with the opposing ones higher and gracefully rounded. The lip is flat and without decoration save on the outer edge which is embellished with a line of small, punctate dots, below which are three encircling, incised lines. The encircling band of design covering the major part of the frieze is composed of an intricate series of incised pyramids formed of lines and dots, the intervening spaces being filled with similar lines. Diameter of body, $5\frac{3}{4}$ in.; diameter of rim, $4\frac{1}{2}$ in.; height, 7 in.

Among the fragmentary Iroquois vessels there were only a few that formed parts of large jars. One of these is shown in plate xxiv, *b*. It is of dark color; the body, shoulder, and neck are plain; the lip is missing. The frieze design is formed by heavily incised lines forming pyramids, the intervening spaces being filled with horizontal lines. The lower margin of the frieze has a row of indentations. Height 10 in.; diameter 9 in.

The complete rim and about half the body of a large jar (pl. xxiii, *a*) was found in Pit 2, in the eastern part of the mound. The body is plain; the neck is broad and incurved. The rim-

collar, or frieze, is broad and angular, causing the mouth of the jar to be practically square. The four angles of the frieze are emphasized by low, rounded lip-projections, encircled on the lower part by a pseudo-textile ornamental design consisting of combinations of straight incised lines and dots arranged in zones. At each angle there is a pyramidal figure, and between the angles are broad, vertical, incised bands, above which is a series of four incised encircling lines. The frieze is bordered by marginal rows of indentations, those on the upper portion having been applied with the edge of an angular punch, the lower being larger and deeper, having a slight node in the upper part. The form of this vessel was evidently suggested by the bark receptacles of the region, the curves and angles of the upper part practically duplicating certain birch-bark vessels. Height 11 in.; diameter $9\frac{1}{2}$ in.

Plate xxii, *a*, illustrates the rim and upper portion of a large jar. As in most vessels of this type, the body portion evidently was plain. The neck also was without decoration, and the upper part is broadly outcurved, giving the frieze a decided overhang. The shoulder is ornamented with a broad band consisting of four incised encircling lines bordered on the upper part by short, oblique incisions and on the lower margin by lightly incised, oblique, ray-like lines. The top of the frieze is tripointed. Two of the line projections are comparatively low and pointed, and are equal in size; the third is higher, much larger, and rounded, and is accentuated by a series of eleven transverse, impressed notches. The lip is square and is unembellished save by a row of slight notches on the outer edge, and, as noted, on the large projection. The frieze is circular, there being no suggestion of angles below the projections; its major part is covered with a closely-applied series of oblique incisions, and the upper portion is bordered by an encircling band composed of four wavy lines. Diameter of rim, $8\frac{1}{2}$ in.

A fragment of a small jar is shown in plate xxv, *b*. The body surface shows the typical smooth finish of Iroquois ware, and is without decoration save on the shoulder, where there is a band of slanting, wheel-made lines. The frieze is decorated with a band of four horizontal fillets having the appearance of heavy coiling; and



FORTIONS OF RIMS OF VESSELS SHOWING TYPES OF FRIEZE DECORATION

above and below, the frieze is margined by a line of slanting, wheel-made lines. The edge of the lip is plain.

EARTHENWARE SHOWING ALGONQUIAN AND IROQUOIS TECHNIQUE
COMBINED

As before stated, among the fragmentary vessels found in the mound were four that combined the technique of both the Delawares and the Iroquois.

Plate xxvi shows half of a small globular jar of Iroquois shape, the surface of which is paddle-marked. The frieze is covered with incised lines, and the general effect is crude in comparison with typical jars of either the Algonquian or the Iroquois. There is a lip-projection, and the frieze below it is covered with crudely scratched lines. Encircling the central portion of the neck is an incised band—an unusual neck decoration. Height $5\frac{1}{2}$ in.; diameter $4\frac{3}{4}$ in.

A fragment of the rim portion of one of these jars has a lip-projection that characterizes Iroquois vessels, but the mixture of the clay and the general treatment of the surface are purely Algonquian. Two other rim fragments show similar characteristics, but whether made by the Delawares or not, they are Algonquian in texture, form, and general treatment.

PITS CONTAINING JARS

The pits containing fragmentary jars, and in one instance a perfect one, are represented by dots on the plan of the mound (pl. II). These pits in most instances were several feet from the nearest skeleton, Pit II, for example, being more than a hundred feet distant from Skeleton 3.

All the pits contained sherds representing either all or a portion of a jar, and in many of the pits were fragments of several jars. In most of the pits the sherds showing decoration were deposited with the ornamented surface down, but whether this was intentional could not be determined.

The rims of most jars are decorated with a frieze. As this part of the vessel usually is the only ornamented portion, the rim fragments present many of the decorative elements employed by the Minisink potters and in the absence of complete jars are worthy

of study. Many sherds showing rim-decorations were found. A number of these, exhibiting distinctive designs, are illustrated in plate xxvii.

The presence of animal bones and charcoal in most of the pits seems to indicate that the deposit had been made in connection with a feast, the remains of which were buried with the vessels.

Objects of a utilitarian nature were found in some of the pits; these included hammerstones, lap-stones, arrowpoints, a fragment of a pipe, etc., but in none of them were ornaments such as were found with the burials.

The following descriptions of the individual pits indicate the depth of the deposits, their general character, and the material found in them.

Jar 1, found southeast of Skeleton 2, was represented by a rim fragment which lay in a disturbed area 2 ft. 9 in. beneath the surface.

Jar 2 was found at the bottom of a discolored area, southeast of Skeleton 4, the fragments being grouped with the outer or design surface down as though they had been placed in the positions in which they were found, not merely thrown into the hole. They were 2 ft. 9 in. below the surface and occupied a space about two feet in diameter. A great many pieces of charcoal were associated with the fragments. The entire rim was found, also part of the base and sides. This jar is shown in plate xxiii, *a*.

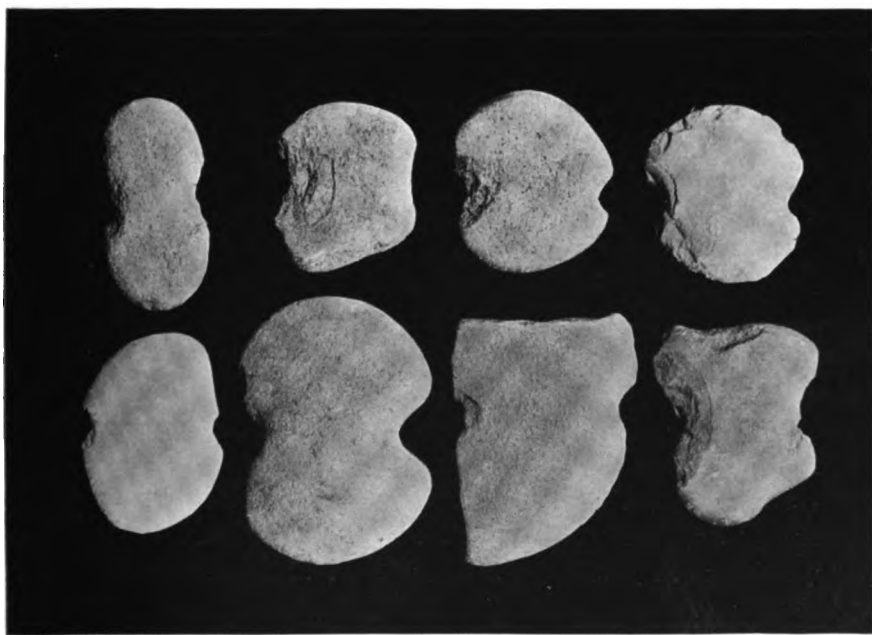
Jar 3 was northwest of Skeleton 7 and was represented by a mass of fragments scattered over a space two and one half feet in diameter. It was near Skeleton 7, but evidently had no connection with it, as there were two distinct disturbed areas over the two deposits. The fragments were those of a very large jar and were so placed as to have the appearance of a mosaic, most of them being on the same level.

Jar 4, northwest of and near Skeleton 13, was represented by a number of fragments scattered over an area two feet in diameter. It was 3 ft. 2 in. below the surface, and at the bottom of a discolored area, but no animal bones were found with it.

Jar 5 was southeast of Skeleton 27; it consists of half of a



a. NET-SINKERS OF THE SMALL THIN TYPE



b. NET-SINKERS OF THE PEBBLE TYPE



a. GRINDING STONE



b. DOUBLE-HANDED HAMMERSTONES

slender vessel and was found 17 in. below the surface, in a disturbed area. Near it were several large stones, some charcoal, and a few potsherds. (Pl. XXVI.)

Jar 6, found 11 in. below the surface, northeast of Skeleton 28, is represented by a fragment of a very thick jar, mingled with which were sherds of other vessels. There were also three hammerstones, an arrowpoint, and a fragment of a pottery pipe. As in the former deposits, animal bones, shells, and charcoal were found in association.

Jar 7 was southwest of Skeleton 27 and was represented by about half the original vessel; it was lying with the design side down and with the rim portion directed toward the west. Grouped about it were fragments of other vessels, all of the decorated pieces having the ornamented surface down. The deposit contained also five large, heavy, pitted hammerstones, a lap-stone, a number of split stones, and the usual charcoal and animal bones. The deposit lay 3 ft. below the surface.

Jar 8, southwest of Skeleton 28, was in a fragmentary condition and the pieces were massed in an area eighteen inches in diameter. It was 18 in. below the surface, and was surrounded by the usual charcoal and animal bones. The decorated pieces were all lying with the design surface down.

Jar 9, northwest of Jar 3, was fragmentary and the pieces were grouped, all the ornamented frieze portions lying with their decorated sides down. It lay 2 ft. 6 in. beneath the surface.

Jar 10, southwest of Skeleton 26, was 19 in. below the surface, in a discolored area and broken into many pieces. Two of the rim fragments were lying with the design side up. In the center of the mass were two stones.

Jar 11 was found in a test trench and lay 123 ft. south of Skeleton 1. It was represented by fragments found 1 ft. 8 in. below the surface. Three or four large pieces were lying with the design side up, but with these exceptions the sherds lay with the ornamented surface down, as in most other cases.

Jar 12 was found 4 ft. 4 in. below the surface, southeast of Skeleton 3, and was accompanied with a fragment of a pipe.

Jar 13, fragmentary, was found north of Skeleton 17, 2 ft. 6 in. below the surface, all the decorated faces downward.

Jar 14, also fragmentary, was south of Skeleton 61 and lay 2 ft. 8 in. beneath the surface. All the decorated sides were down.

Jar 15, entire, was west of Skeleton 56 and was found 1 ft. 8 in. down, lying on its side, inclined at an angle of 30°. The rim was upward. (Pl. xxv, *a*.)

Jar 16, broken, was east of Skeleton 63 and lay bottom upward 2 ft. 2 in. below the surface.

Jar 17, broken, was found only 2 in. below the surface. It was west of the burial area and 30 ft. northwest of Skeleton 63.

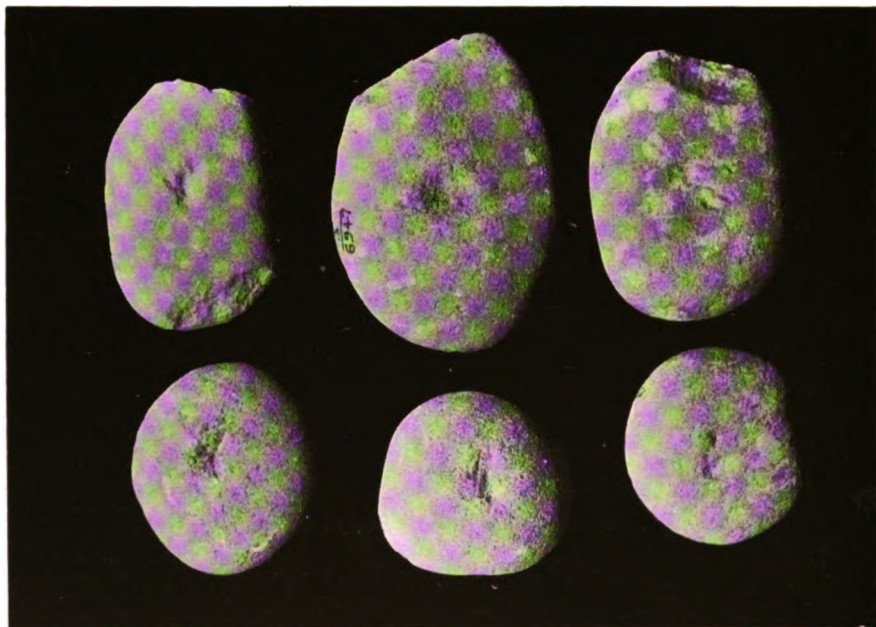
Jar 18, likewise broken, lay 1 ft. 8 in. down. It was northeast of Jar 17.

Jar 19, north of Skeleton 60, and also broken, was found 4 ft. below the surface.

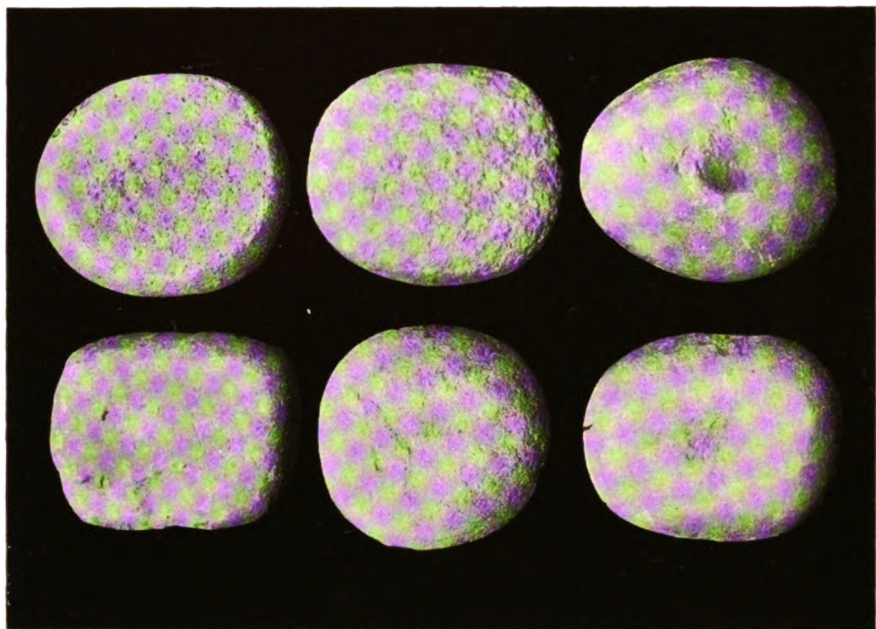
OBJECTS OF STONE

Objects of stone are represented by most of the artifacts of this material known to the region under discussion.

As the Munsee of the Delaware River region must have subsisted to a considerable extent on fish, one would expect to find net-sinkers in their refuse heaps and on their village sites. Our excavations resulted in the finding of 166 of these objects, many of them at a depth of more than three feet. Three types of net-sinkers are represented. One of these types, shown in plate xxviii, *a*, is made of a thin section of sandstone, or of other stone having a regular line of cleavage. Many of this class are quite small, measuring only 2 in. in diameter; there are 99 of these. Net-sinkers of the second type (pl. xxviii, *b*) are made from pebbles. The edges of the specimens of the first type were chipped or ground to a greater or less extent, whereas in the second type the only evidence of workmanship is in the notches chipped or ground in the opposing edges of the stone. Of this class there are 48 examples in the collection. Those of the third type also are made of pebbles, ovoid or irregular in shape, and each has an encircling groove usually pecked in the surface. As in most



a



b

PITTED HAMMERSTONES

eastern localities, this type was the most unusual, only 19 having been found.

Hammerstones of many sizes and shapes were recovered; these range from the heavy, two-handed hammers, some of which measure 9 in. in length by 3 in. in thickness, to the very small ones used for pecking the surface of implements in the process of their manufacture. There are eight of the heavier class, two of which are shown in plate XXIX, *b*. These are natural boulders, but all show evidence of use, some being deeply pitted, while others have but slight artificial depressions.

Small pitted hammerstones from the mound are shown in plate XXX. There are 49 of these, ten of them having been used secondarily as rubbing stones.

Various other forms of hammerstones are represented, many of them being elongate, in which cases one of the ends of the implement exhibits wear.

There are few grooved axes and mauls, three of the former and one of the latter being the only ones unearthed.

Ten smoothing stones were found, and there are six large, flat stones that evidently had been used for grinding. One of these, shown in plate XXIX, *a*, measures 17 in. by 15 in., and is 3 in. thick. Both surfaces are smooth, but the surface presented in the illustration shows considerable wear. The second in size is in the form of an irregular disc, averaging 9 in. in diameter and $2\frac{1}{2}$ in. in thickness. The edges of both of these specimens have been worked, but the smaller one has the entire edge chipped. Implements of this class are sometimes called "lap-stones," but as many of them are large and heavy and exhibit use for grinding purposes, they were probably employed for grinding grain as are the metates of the Southwest.

In the collection are eighteen celts, only three of which are perfect, and four chisels which are shown with some of the celts in plate XXXI, *a*. Included in the collection are also sixteen pestles (examples of which are shown in pl. XXXI, *b*), hoes (pl. XXXII, *a*), scrapers (pl. XXXIII, *b*), pecking stones, "turtle-backs," discs, arrow and spear points (pl. XXXII, *b*), drills, reamers, two sinew

smoothers (shown in plate XXXIV, *b*), a fragment of a large discoidal stone, catlinite beads, and a stone shaped as if for use as a pendant or gorget, $4\frac{5}{8}$ in. long, $4\frac{1}{4}$ in. wide, and $\frac{1}{2}$ in. thick (pl. XXXIII, *a*). This object was not drilled; but another, somewhat shorter and thicker (pl. XXXIII, *b*), shows the original drilling, which had broken out, as well as two attempts to drill new holes.

While conducting the explorations in the Bell Mound a large stone spade was found on adjacent property, but owing to its size is worthy of mention here (pl. XXXIV, *a*). This object is made of a hardened shale approaching slate, from which flakes have been chipped; it measures $10\frac{1}{2}$ in. in length and 5 in. in width, and the point shows wear from use. Spades of this size and type are not often found in the region under consideration, and it is possible that it may have been derived from another section, although the material might be from the Delaware valley.

A catlinite pipe was found by a farmer in a field a short distance from the Bell farm and was acquired from him for the collection. This specimen (pl. XXXIII, *a*) is $1\frac{1}{2}$ in. long and $1\frac{1}{4}$ in. high. The edges are ornamented with incised designs as shown in the illustration. As beads of catlinite, or pipestone, were found with skeletons as well as in the general excavations at Minisink, barter for this material may have been conducted by the Delawares and Iroquois in early times. Loskiel,¹ in speaking of the Delawares, says:

They are fond of a handsome head for their pipe, and prefer those made of red marble. But these are only used by the chiefs and captains, this sort of marble being rare, and found only on the Mississippi.

Dr Charles Rau,² writing in 1872, says:

Not long ago a small Catlinite pipe of unusual shape was sent to me, which had been ploughed up in a maize-field near Centreville, in Southern Illinois (St Clair County). Such older specimens are even met in the New England States, near the Atlantic coast. The collection of the Smithsonian Institution contains some pipes and ornaments made of

¹ *History of the Mission of the United Brethren Among the Indians in North America*, London, 1794, p. 51.

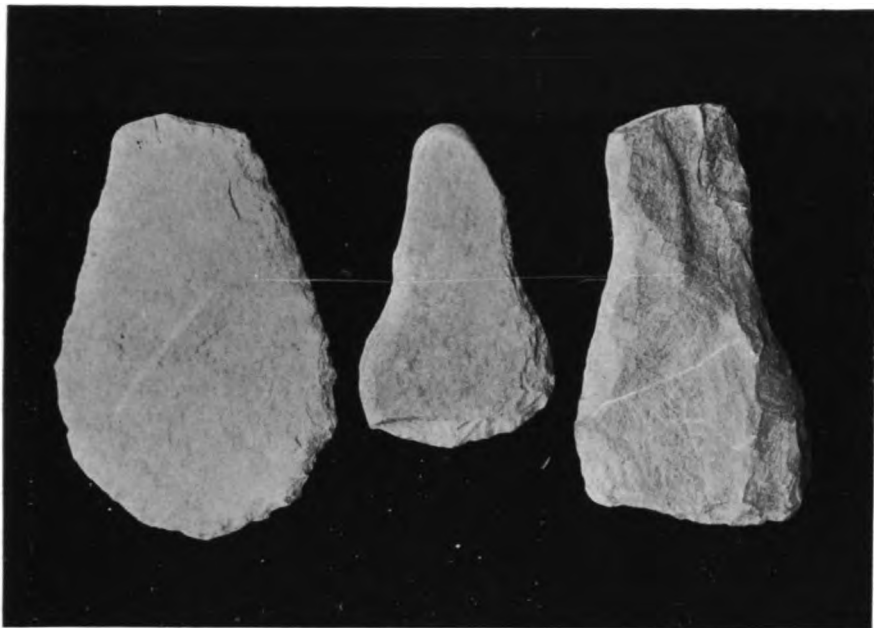
² *Ancient Aboriginal Trade in North America, Smithsonian Report for 1872*, p. 372.



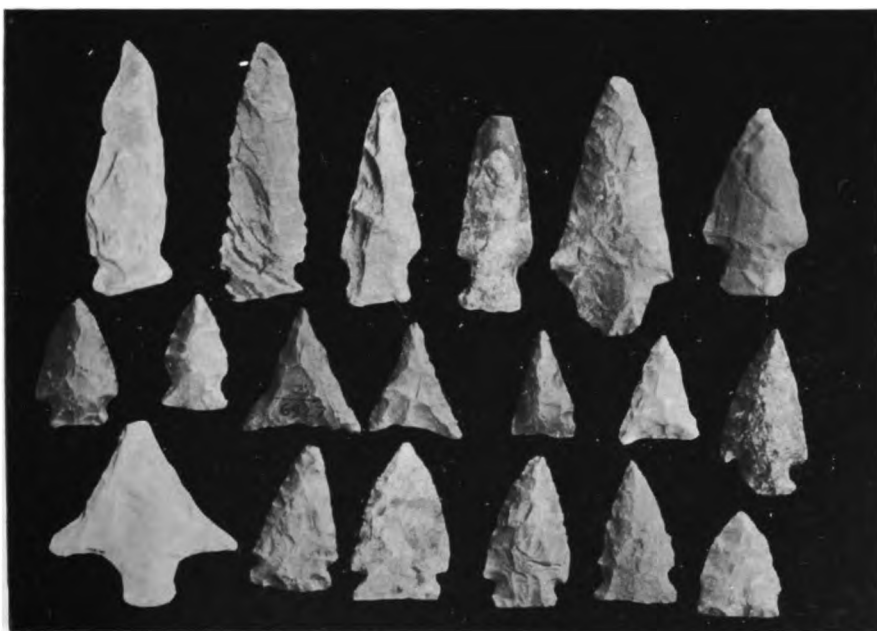
a. CELTS AND CHISELS



b. PESTLES



a. HOES



b. ARROWPOINTS

Catlinite, which were taken from Indian graves in the State of New York, or obtained from the Iroquois still inhabiting the same state. The raw or worked red pipestone, therefore, constituted an article of barter, which was brought from its original place of occurrence to the present Eastern states of the Union.

OBJECTS OF SHELL

Independent of burials were several deposits of freshwater clam shells, found in connection with feast-pits, but none of the shells showed signs of use. Snail-shells also were found in some of these pits, but whether they had been buried intentionally or had simply been in the surface soil with which the pits were filled could not be determined. Among the worked-shell objects, not associated with burials, was the columella of a small whelk, a few fragments of sea-shells, a tubular bead, and a number of fragments of other beads.

OBJECTS OF BONE AND ANTLER

Comparatively few bone implements were found in the mound, but many bird and mammal bones were present in the feast-pits associated with burials. The bird-bones were mostly those of the turkey; the mammals represented were the deer, elk, dog or wolf,

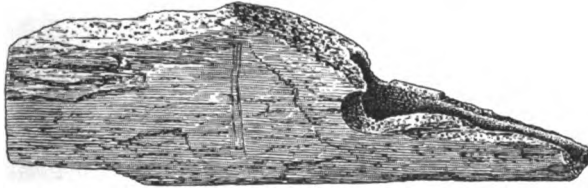


FIG. 21.—Bone knife handle.

fox, beaver, and a number of smaller animals. Bones of the larger mammals, split for obtaining the marrow, were found in all the feast-pits. A few of the bones showed the marks of animal teeth.

Among the bone objects found apart from the graves is a knife-handle (fig. 21), in fragmentary condition, but sufficiently preserved to show that it had been 3 in. in length and 1 in. in width. A hole

had been drilled through it for the insertion of a peg to hold the blade in place.

Ten bone awls were recovered. Seven of these are made from split fragments of deer-bone, the ends of which have been pointed. Plate x, B (*a-e*) are of this type; *f* was found with Skeleton 44; *g* is an unfinished awl of the slender type.

One bead, made from a bird-bone, the ends of which are squared, was found; likewise the toe-bone (phalanx) of a deer, one end of which has been cut off, the other perforated, probably for use as a gaming die; and a few bones that show evidence of cutting.

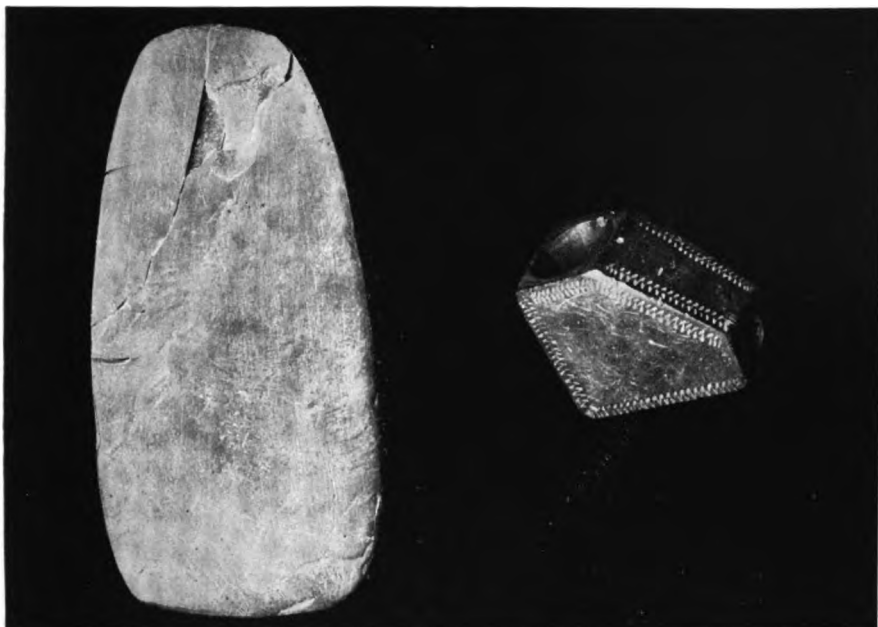
We may include here a fragmentary drinking-cup made from the carapace of a box-turtle.

Many pieces of deer-antler were found, but only a few that exhibit signs of artificial treatment. Some of the larger pieces have been gnawed by animals (pl. x, A, *a*), and others show the marks of cutting implements (pl. x, A, *c*). Fourteen prongs of antler, some of which were probably used as bodkins, are among the objects recovered. There are also two antler arrowpoints (pl. x, A, *b, d*), one short and massive, measuring 2 in. in length, the other shorter, more delicate in form, but not so well preserved. These arrowpoints of antler were the only ones found during the course of the investigations.

PIPES

Only one complete native pipe was found apart from burials: this was in the western part of the mound and was lying at a depth of 8 in. below the surface, immediately above a deposit of shells measuring 2 ft. 6 in. in diameter, 2 ft. thick, and 2 ft. beneath the surface. Under this deposit, 3 ft. below the surface, was a layer of burned stones 6 in. thick.

Similar shell deposits were found in other parts of the cemetery. Not far from Skeleton 25 was a mass of ashes and calcined shells measuring 2 ft. by 3 ft., and nearly 3 in. in thickness. It was surrounded by fragments of pottery, charcoal, and animal bones. This deposit lay 14 in. below the surface and had evidently been the result of a mortuary feast-fire.



a. PENDANT-SHAPED STONE FROM THE MOUND, AND CATLINITE PIPE FROM A FIELD NEAR THE BELL FARM



b. A PENDANT AND FOUR SCRAPERS

The pipe above referred to (pl. XII, *c*) is of pottery, is 6 in. long, and was in two pieces. It is of light-colored ware; the stem is flattish on the upper and lower surfaces, broad near the bowl, and tapers to a rounded point at the mouth-piece. The flaring bowl has a projecting rim, the lip of which is decorated with a series of parallel, incised lines.

A fragment of another earthenware pipe, not connected with a burial, was found (fig. 22). The stem had been broken and

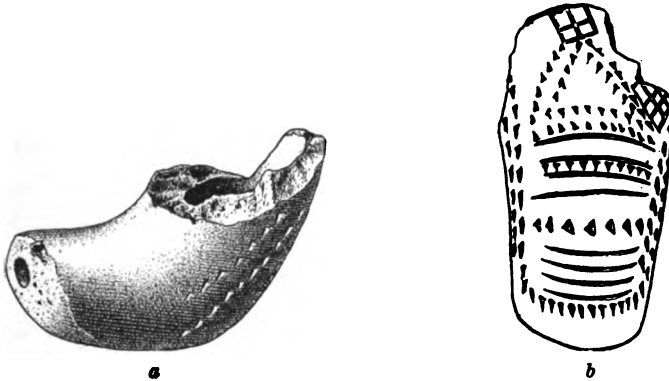


FIG. 22.—Fragment of a pottery pipe (*a*), and the design thereon (*b*).

its end smoothly ground. The bowl also is broken, but the remaining portion shows that it had been decorated with a series of incised lines and angular indentations.

The two pipes described, together with seven pottery stems and a fragment of a pipe-bowl, are the only examples of aboriginal pipes found apart from burials.

Although a number of European trade-pipes were found with skeletons, there was none elsewhere in the mound. Five fragments of stems of clay trade-pipes were found, however, some of which may have been used as beads.

OBJECTS OF METAL

Only one metal object was found aside from those associated with burials. This is the bowl of a brass spoon, drilled at the handle end probably for suspension as an ornament (pl. XVII) A piece has been cut from the edge.

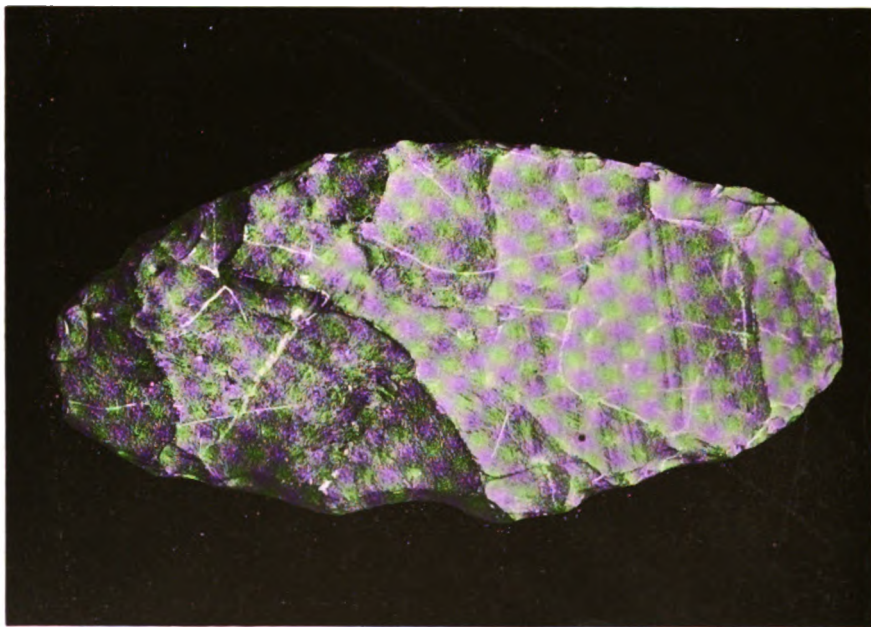
OTHER MATERIALS FOUND

Charcoal was present in all parts of the mound where disturbed earth was encountered. Through the upper soil it appeared in small pieces, but at the bottom of the feast-pits large pieces occurred. Walnuts were found in various parts of the mound, but as a walnut tree is growing on the mound its fruit may have been carried to the lower levels by burrowing animals.

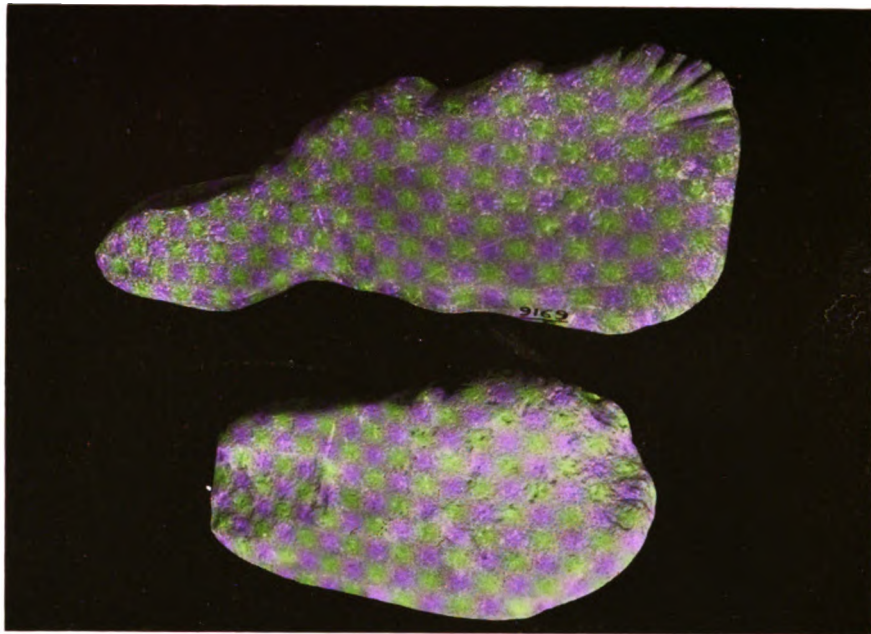
CONCLUSIONS

The cemetery which formed the subject of the investigations described in this paper was associated with a village of the Munsee tribe of the Delaware Indians, as shown by documentary evidence, supported by our archeological studies. The date of the abandonment of the Minisink village has not been determined, but from the information available its inhabitants departed from the locality in the early part of the eighteenth century, after years of contact with white people. This is indicated by the presence of various articles of European provenance in association with the burials, such as objects of metal, trade-pipes, glass beads, etc., and by the fact, as determined by Dr Hrdlička, that one of the skeletons found in the Minisink cemetery is that of a white man. If it is finally shown, as some authorities now believe, that burials of the dead were not made in a fully extended position until after missionaries had impressed their teachings on the aborigines of this region, we have additional evidence, if such were needed, of the effect of the contact of civilization on the natives of Minisink, as twenty-eight of the forty-five burials whose position of burial was determinable, were interred in this manner. In a report of investigations of the Van Etten site, farther up the Delaware river, near Port Jervis, New York, some of the graves contained wooden coffins, and in each such case the associated burial was in an extended position.

The exploration of the Minisink cemetery has furnished considerable objective material for comparative study, but more is required. It is regretted that a greater number of perfect vessels of pottery was not recovered, as the ceramic art of this Algonquian



a. STONE SPADE FROM THE FIELD ADJOINING THE BELL FARM



b. SINEW SMOOTHERS

area is not adequately represented in our museums. Nevertheless, both the entire vessels and the fragmentary jars from Minisink have supplied information of importance with respect to form and ornamentation, and show the influence of Iroquois people on the Algonquian inhabitants of the site in question, under whose domination the latter are known to have been during the early historical period. Other artifacts are likewise of interest and importance: the objects of shell exhibit a considerable range of form and ornamentation, and with the pottery attest to the esthetic sense of the Minisink people. This is the more noteworthy because of the fact that only thirty of the sixty-eight skeletons were accompanied with objects of any kind, and several of these had merely a piece of stone, a rock crystal, a bear's tooth, or a fragment of pottery. In some Eastern burial sites stone implements were deposited with the dead, but none was found with the burials at Minisink, whose inhabitants seem to have conferred on their departed few objects of a utilitarian character. Possibly this discrimination may be another indication of missionary influence. Regarding the mortuary customs of the Delawares, Loskiel,¹ the Moravian missionary, wrote in 1788:

"They used formerly to put tobacco pouch, knife, tinder box, tobacco and pipe, bow and arrows, gun, powder and shot, skins and cloth for clothes, paint, a small bag of Indian corn or dried bilberries, sometimes the kettle, hatchet, and other furniture of the deceased, into the grave, supposing that the departed spirits would have the same wants and occupations in the land of souls. But this custom is almost entirely abolished in the country of the Delawares and Iroquois."

Of particular value to the study of the archeology of the Delaware valley will be the report on the skeletal remains now in preparation by Dr Aleš Hrdlička of the United States National Museum, to which institution the human bones were presented by the Museum of the American Indian. In his study of the crania from the Minisink cemetery Dr Hrdlička has noted an unexpected form, resembling the Shawnee crania far more closely than those of other Algonquian tribes, including even the Delawares. These inter-

¹ *History of the Mission of the United Brethren*, p. 120, London, 1794.

esting observations will be set forth fully in Dr Hrdlička's report, which will include comparative data on the crania of the tribes which formerly occupied the Atlantic seaboard.

The valley of the Delaware still offers many possibilities in the way of archeological research. A careful survey will no doubt bring to light numerous village sites of a more ancient period, and their cemeteries will doubtless yield many artifacts of value to the study of our aboriginal tribes. It is hoped that the results recorded in this paper may prove useful to future students of this interesting field.

ENGRAVED CELTS FROM THE ANTILLES¹

BY

J. WALTER FEWKES

WHEN the West Indies were discovered by Europeans, the aborigines of those islands were living in what is called, in archeological literature, the Neolithic or polished stone age. A few chipped stone celts found in some of the larger islands indicate that, while the aborigines made casual use of such implements, they are so few in number that we cannot ascribe a Paleolithic epoch, or an age of chipped stone implements, to the islands.

The majority of stone objects known from the larger islands are finely polished, while those from the Lesser Antilles are of different form and have a rough surface. The former are called celts, the latter are commonly known as axes.

The peculiarities of these stone objects from the West Indies indicate that in prehistoric times the islands formed a sharply defined culture area; and the technic of the objects suggests occupancy by man for a considerable period, for many years were required for the development of the culture expressed by them. We find, furthermore, that the geographical distribution of the two different types of these objects can best be explained by the supposition that they belong to two radically different culture regions, which are readily distinguishable. These two subcultural centers, geographically speaking, are the Greater Antilles and the Lesser Antilles: the former characterized by the smoothly polished celt, the latter by the rough axe having an enlarged, well-developed poll differentiated from the blade by encircling grooves or marginal notches to accommodate the hafting. While the celt has no indication of a head, and the extremity of the blade tapers to a point, the head of most of the axes from the Lesser Antilles is often broader or larger than the blade, and is variously modified into projections,

¹ The material used in the preparation of this article was collected while the author was engaged in the preparation of a report on the archeology of the West Indies under the joint auspices of the Bureau of American Ethnology and the Heye Museum.

horns, or bifurcations, but very rarely takes the form of an animal's head.

The type form of celt from the Greater Antilles is of almond or petal shape, hence the term petaloid. Although petaloid celts occur in greater or lesser abundance¹ throughout the West Indies, this form is particularly characteristic of the Greater Antilles. Implements of this type are generally made of stone, but when suitable stone does not occur, shell is used for the purpose.

No implement of the polished stone epoch in America surpasses the petaloid celt in the regularity of its form or in the beauty of its superficial finish, the surfaces of many of these objects being as smooth as glass. There is considerable variation in their size, but only slight modification in their profile, the general almond or petaloid form being constant.

A cross-section of one of these implements, taken midway in its length, is generally oval;² but a few are rectangular, save that the angles are somewhat rounded. The greatest breadth of a typical petaloid is near the middle. These celts have blunt edges and taper to a point; grooves or perforations for hafting are never found.

The petaloid type of celt grades almost imperceptibly into the axe form, or that with the poll modified into a head and without the pointed blade end.

Petaloid celts figure extensively in the folklore of the modern islanders. In Porto Rico and other Spanish islands of the West Indies petaloid celts are commonly called *piedras del rayo*, "thunder-stones," and they are also so designated in the English islands. They are supposed by the country people to be endowed with magic power, and are regarded as efficacious in healing certain diseases; they are likewise believed to protect the natives from lightning, being frequently deposited for that purpose under the thatch of

¹ The petaloid type occurs as far south as Trinidad, its northern extension being the Bahamas. About ninety percent of all stone implements from the Greater Antilles are petaloid celts, while an equal proportion from the Lesser Antilles consists of axes.

² It has been stated that grooved axes (as distinguished from celts) are not found in the West Indies, but in the Heye Museum we find them well represented from St Vincent and other islands of the Lesser Antilles. The author has seen very few axes of this type from the Greater Antilles.

the roofs of their cabins. In St Vincent and other islands "thunder-stones" are placed in earthen jars to keep the drinking water pure and cool. They are conspicuous in the equipment of the African *voodoo* or *obia* men of the islands, who are said to employ them in some of their rites of sorcery. Indeed there are many superstitions and considerable folklore associated with these stones. It is said that they are sometimes found in trees riven by lightning, while others declare they penetrate the earth and come to the surface in seven years. A true thunder-stone, according to some informants, may be determined by binding a thread about it and applying a lighted match. If the thread burns, the stone is genuine. Several specimens bear superficial marks of having been tested in this way.

The writer has found several petaloid celts in his excavations in caves and shellheaps in Porto Rico, but most of the hundreds of examples obtained by him were purchased from the country people, who, finding them in the soil while cultivating their *canucos*, or small farms, preserve them for the purposes above mentioned. The majority of those purchased by the author are slightly nicked, the points or edges having been broken by their finders in the belief that they contain "electricity."

Specimens of Antillean petaloid celts with figures or faces carved upon their surfaces are rare. These probably were carried by the pointed extremity.¹ The most highly ornamented bear a morphological likeness to idols, and their forms imply more than the term "decorated celt" would indicate, for some of them are figurines to all intents and purposes. However, the step from the incised celt to the idol, as elsewhere with man in the lower stages of culture, is here so slight that nothing can be gained by ascribing one use or name to the engraved petaloid and another to the petaloid in human form.² The form and symbolism of the petaloid celts

¹ The term "decorated celt," or celt with incised decoration, may suffice to designate the simpler forms of these, but it does not adequately apply to the highly developed members.

² The monolithic stone celts, or those in which blade and handle are carved from one stone, are supposed to have been ceremonial in nature, or to have been used in religious practices. Incidentally they indicate the manner in which a wooden handle was attached to a smooth undecorated celt, and may throw some light on the probable way in which the celt with a figure engraved on one side was used.

with figures engraved upon them have led the author to the belief that these objects were never furnished with handles, but were used symbolically as insignia of rank by carrying in the hand by their pointed ends or inserted in staffs for the same purpose.

Engraved celts have been collected in the Bahamas and the Greater Antilles, but none has been found in the lesser islands. The specimens in the following list¹ comprise the more important variations in this type.

1. Berlin Museum, No. 1
2. Rae specimen
3. Berlin Museum, No. 2
4. British Museum (four specimens)
5. United States National Museum
6. Heye Museum
7. Museum of the University of Havana
8. Copenhagen Museum
9. Heye Museum (stone "dirks")
10. Blackmore Museum (stone "dirks")

Examination and comparison of the specimens here listed show that while they vary considerably in form, there is a sufficiently well-marked resemblance to warrant the assignment of all to a single type. In its simplest form the incised petaloid celt can hardly be distinguished from an undecorated petaloid, the only difference being the human face cut upon its surface.

1. *Berlin Museum, No. 1.*²—This specimen (fig. 1) is one of the simple forms of ceremonial petaloid celts. Its thickness is slight, compared with the breadth, and the lateral as well as the terminal edge is sharp. The specimen measures 13.5 in. in length, 3.25 in. in breadth at the middle, and 2 in. in thickness. The main feature of this celt is the incised circle on one side, enclosing other circles indicating eyes and mouth. Below this face, the arms with elbows upward are indistinctly represented by slight grooves. The speci-

¹ The author knows of the existence of others, but having no notes or figures pertaining to them, further reference is omitted.

² It is with great pleasure that the author here acknowledges his thanks to the authorities of the Berlin Museum für Völkerkunde for permission to publish illustrations of these objects.

men came to the Berlin Museum from Dr Grosser, the German consul at Plaisance, Hayti.

2. *Rae specimen*.—Mr Theodoor de Booy has called my attention to an almost identical specimen found on a farm in New Providence, Bahamas, and now owned by Mr C. S. Rae of Nassau. Mr de Booy believes this specimen is mentioned in a work on the Bahamas, but he has not seen it figured. To supply this want he has sent me drawings from the specimen itself, with the dimensions indicated. The extreme length is 10.5 in., the width 3.5 in., and the thickness 1.5 in. The face of the celt is 2 by 1.75 in. A circle represents the face, and is confined to one side, the opposite surface being plain. It seems probable that this celt was brought to the Bahamas from a neighboring island, and its close similarity to that from Hayti, above mentioned, suggests the latter as its place of origin.

3. *Berlin Museum, No. 2*.—This incised celt (fig. 2),¹ said to have come from the Danish island of St Thomas, is one of the most beautiful ceremonial petaloid celts known to the author; its technic recalls stone objects from Santo Domingo, Porto Rico, and Hayti.² The outward form of this specimen, seen in profile, is petaloïd; the figure engraved upon it is well carved and was unmistakably designed to represent a human being. It measures 8.25 in. in length by 3 in. in



FIG. 1.—Engraved celt, Berlin Museum, No. 1. (Length 13.5 inches.)

¹ These figures and the preceding were made by my friend W. von den Steinen, of the Berlin Museum.

² Probably this celt came originally from one of these islands, rather than from St Thomas.

maximum width. The details of both surfaces are so well shown in the illustrations that there is no need of an extended description. The style of the figure is thoroughly Antillean, and is very char-

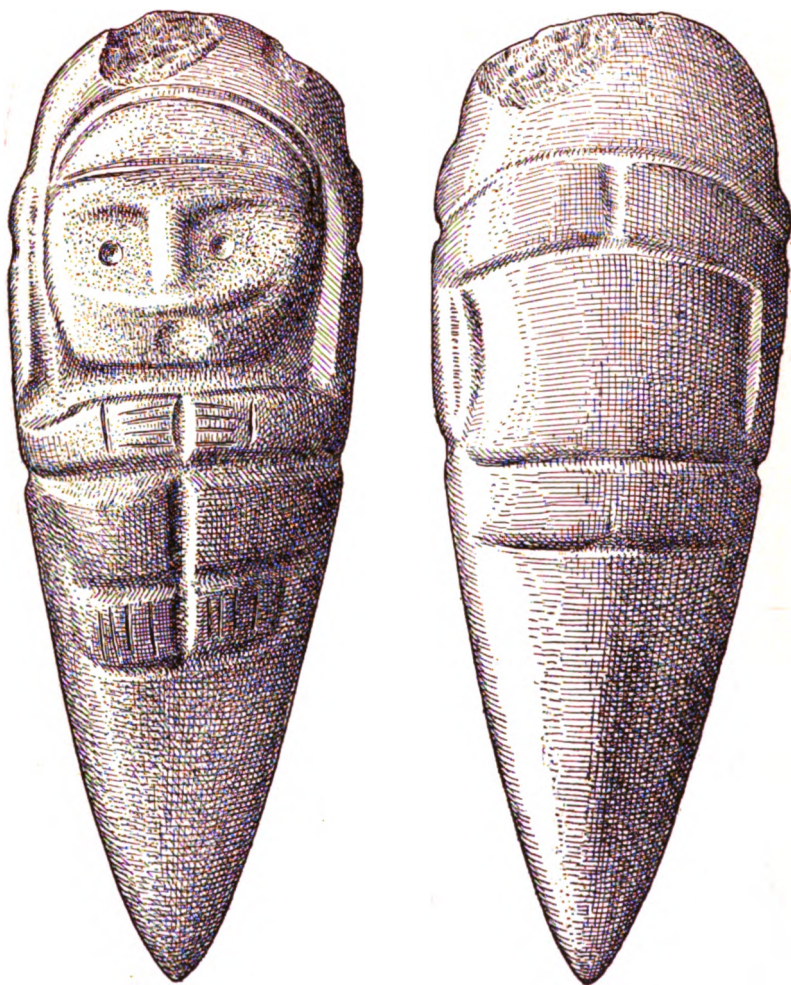


FIG. 2.—Front and rear views of an engraved celt, Berlin Museum, No. 2.
(Length 8.25 inches.)

acteristic of the motive so constantly found in engraved figures of human beings from these islands, especially those cut in low relief

on stone, shell, or bone. This specimen may be regarded as an intermediate form between a smooth celt with a face incised on the surface and that in the Royal Museum in Copenhagen, to be considered later, in which the celt form has almost disappeared.

4. *British Museum* (four specimens).—Four specimens in the British Museum preserve the petaloid form, but they are not so symmetrical nor so well made as some others.¹ They are, however, especially instructive in that they show an elongation of the pointed end in the form of a handle, while the cutting edge may still be seen above the head. The position of these celts in a hypothetical series illustrating the modifications in the type would lie nearer the simplest than the most complicated form. This shows connection with another series, for they grade into a group of globular stone objects, or heads, with handles, a form without indication of a cutting edge and showing no relation to celts.

5. *National Museum*.—This instructive type specimen of engraved or ceremonial celts, from Santo Domingo, first described and illustrated in the author's work on the Aborigines of Porto Rico,² was formerly in the collection of Archbishop Meriño. This specimen has the true petaloid form, on one side of which eyes, nose, and mouth are incised in an oval representing a human head cut in low relief. The hands with the fingers drawn up under the chin, and the low projection rising between them, display a feeble attempt to represent either the body or its appendages. On its reverse side the surface of the implement is plain and slightly curved, as is true of all celts on which a face or a head is represented on the opposite side. There is no good reason to believe that this celt had a handle, as no sign of former attachment is to be seen; indeed if there had been a handle, a part of the sculptured figure would have been concealed thereby. The celt is of greenish stone and measures 14 inches in length.

6. *Heye Museum*.—Mr Theodoor de Booy collected in the Bahamas a broken ceremonial petaloid celt, which is now in the Heye Museum. The edge of this celt and the surface bearing the

¹ These have been figured and described by Mr. T. A. Joyce, *Jour. Anthr. Inst. Great Britain*, n. s., XXXVII, pl. lv, figs. 1-4.

² *Twenty-fifth Ann. Rep. Bureau of American Ethnology*, pl. xv, a.

figure are mutilated, but enough remains of the body to enable us to know its form and to verify Mr de Booy's identification.¹

7. *Museum of the University of Havana*.—Aside from a brief field note made by the author, there is little information concerning a ceremonial petaloid celt now preserved in the University of Havana. This specimen is thus referred to in the author's pamphlet on the Prehistoric Culture of Cuba:

"Among the objects seen in these two collections [Academia de Ciencias, and the University at Vedado] are ten petaloid celts in the Academy museum and double that number at the University. One of those in the latter collection has a stone handle like those obtained in 1903 in Santo Domingo. There is also a celt with a face cut on one side—evidently a ceremonial celt like one in Archbishop Meriño's collection."²

8. *Copenhagen Museum*.—There is a remarkable engraved petaloid celt in the Ethnological Museum of Copenhagen, Denmark. This specimen (fig. 3) is of a hard black stone, well made, and its surface is smoothly polished. It is said to have come originally from Santo Domingo, and to have been added to the Museum in 1861. Through the kindness of Professor Sophus Müller, director of the Museum, the author was able to make the photographs from which the accompanying illustrations have been reproduced. The only other figure of this object appears in Rudolf Cronau's work on America.³

STONE "DIRKS"

Certain implements with carved figures and with long blades ending in a point, ascribed to prehistoric Santo Domingo, find a fitting place in our classification in conjunction with the ceremonial petaloid celts. Their form is somewhat different, but they may readily be assigned to the same type. The main difference is the absence of a cutting edge, the object being prolonged into a pointed blade. Two of these objects are known to the author.

¹ This specimen is figured by Mr de Booy in his article on Lucayan Antiquities, *American Anthropologist*, n. s., vol. xv, no. 1, p. 6.

² *American Anthropologist*, n. s., vol. vi, no. 5, p. 594.

³ *Amerika. Die Geschichte seiner Entdeckung von der ältesten bis auf die neueste Zeit*, Band I, p. 357, Leipzig, 1892. Cronau labels the figure of this object a "hand weapon," an identification that is not far from correct.

9. *Heye Museum*.—On his expedition to Santo Domingo in the interest of the Heye Museum, Mr Theodoor de Booy collected a stone "dirk" which, while allied to some of the incised ceremonial celts, still shows a form quite unlike any previously described. The

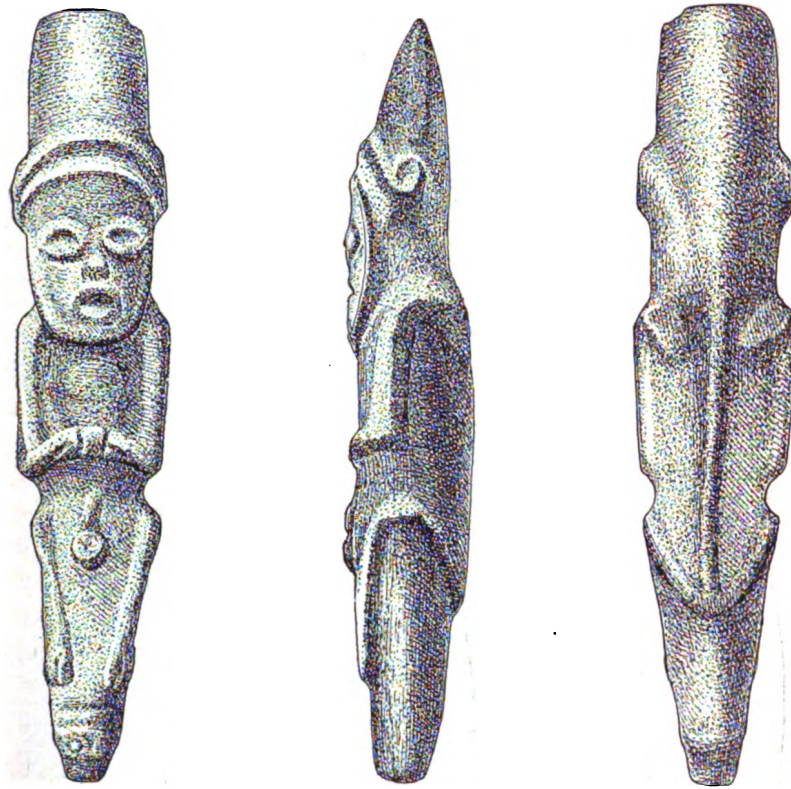


FIG. 3.—Front, side, and rear views of engraved celt, Copenhagen Museum.
(Length about 15 inches.)

specimen was formerly in the collection of the late Señor José Gabriel García, of Santo Domingo City. Its general form (fig. 4), as shown in Mr Baake's drawings, resembles a dirk, the handle of which is modified into a blade. It measures 8 inches in length.

10. *Blackmore Museum*.—Stevens¹ figures another object of this

¹ *Flint Chips. A Guide to Prehistoric Archaeology*, London, 1870. According to Stevens (p. 226): "Two similar specimens are in the Christy collection. Another is in the collection of Mr Hodder M. Westropp of Rookhurst, Cork; and another, said to have been found at Aigueperse, near Rion, Puy-de-Dôme, France, is in the Clermont Museum."

kind which also came from Santo Domingo; it shows indications of secondary work, and the tool marks upon it, according to

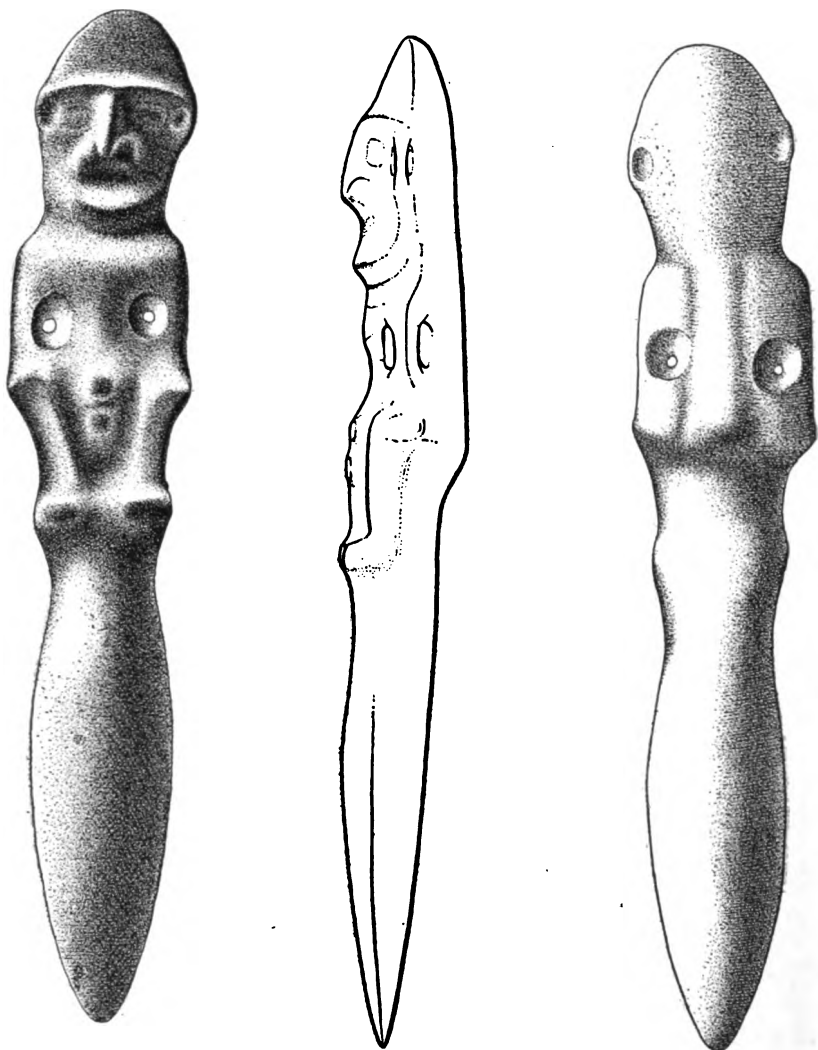


FIG. 4.—"Dirk" in the Heye Museum. (Length 8 inches.)

Stevens, "have been removed by subsequent polishing." This author also calls attention to a "sketch of a somewhat similar

weapon" engraved upon a map of Santo Domingo, published by Charlevoix in 1731.¹ This specimen is described as having been found in an Indian sepulcher.

In considering the morphology of these "dirks" we may suppose theoretically that they present the most highly specialized form of incised or ceremonial petaloid celts, but it may be that the part corresponding to a blade was used as a handle by which the object was carried in the hand, this handle possibly having been inserted into a staff, or set in a stand, or even planted in the ground. The use of these objects is problematical, but there is no evidence that they were ever tied to handles midway of their length.

CONCLUSION

While the celts above described have, in one or two cases, no longer a petaloid form, their relation to an undecorated petaloid is evident, for the main characters of the type are preserved and the modifications are not difficult to follow.

The cultural differences in the prehistoric aborigines of the Greater and the Lesser Antilles are nowhere better shown than in their typical implement forms. Stone implements of the Greater Antilles are celts without grooves for hafting, while axes with marginal notches, enlarged heads, or encircling grooves characterize the Lesser islands. The celts of the former islands recall Central American and North American forms; the axes found in the Lesser Antilles are South American in type.

Celts with either smooth or decorated surfaces, as described in the preceding pages, are rarely found in the chain of islands from Anagada Passage to South America, nor have similar petaloids yet been reported from the adjacent continent. The petaloid celt may therefore be regarded as characteristic of the Greater Antilles, as are also elbow-stones, stone collars, and tripointed stone zemis or idols. The technic of these objects from the West Indies is

¹ The following footnote reference to this map appears in Stevens: "The map is entitled, 'L'Isle Espagnole sous le nom Indien d'Hayti, ou comme elle étoit possédée par ses habitants naturels lors de la découverte, avec les premiers Etablissements des Espagnols. Par le Sr. D'Anville, Geographe Ord. du Roi. May, 1731.' The figure of the implement has been copied in the 'Trans. Amer. Ethno. Soc.,' vol. iii, pt. 1, fig. 7 a."

superior to those found in the southeastern area of the United States, but is not better than those of the coast of Central America, a fact which, so far as it goes, points to ethnic kinship with the latter rather than with the former area. It can also be shown that the stone axes of the Lesser Antilles, like the ceremonial petaloids above described, likewise bear incised decorations on one side, although so far as known these incised figures represent geometrical designs and not human faces or bodies.

There are a few known Antillean axes in which the head is cut into the form of an animal. A specimen from eastern Cuba is the best known example; this probably came from the Greater Antilles, where it may have been transported from an island farther south. This specimen, now in Madrid, has been called a zemi (idol) and identified as a fish; it is figured by Poey in a paper on the archeology of Cuba,¹ and is practically identical with several known Antillean axes the heads of which partake of human or animal forms.

In a future article the author hopes to consider this and other forms of incised and engraved Antillean axes from the chain of islands extending from St Thomas to Trinidad. Excepting the probability that they are ceremonial in nature, they have little in common with the incised celts characteristic of the Greater Antilles.

¹ "Cuban Antiquities: A brief Description of some Relics found in the island of Cuba," *Transactions of the American Ethnological Society*, vol. III, pt. 1, pp. 185-202, New York, 1853, reprint 1909.

CERTAIN WEST-INDIAN SUPERSTITIONS PERTAINING TO CELTS.

BY THEODOOR DE BOOY.

THE writer of the following paper was enabled during a period of five years — in which he had frequent occasion to visit the West Indian Islands, and more particularly the Bahamas, Jamaica, Cuba, and Hayti — to collect a certain number of superstitions and beliefs about celts. From the nature of the writer's work — i.e., the collecting for the Heye Museum of New York City of archæological specimens of the pre-Columbian tribes that inhabited these regions — it can readily be understood what great facilities he had to acquire data on these various beliefs, especially as the present-day population set great store on celts in their possession, and, in consequence of their superstitions regarding them, attach a far greater monetary value to specimens of this class than they do to such other aboriginal artifacts as they may happen to possess. The result is that the inquiring archæologist is told of the particular reason why the owner of the celt values his property so highly; and while this frequently means that the price asked for a specimen is totally out of reason, and that therefore a purchase cannot be considered, the inquiry proves to be of interest to students of the folk-lore of these regions.

Let it first be stated that the usual name in the West Indies for the petaloid celt is "thunderbolt," "thunderball," or "thunderstone," on the British Islands; "piedra del rayo" ("lightningstone"), on those islands where Spanish is spoken; and "pierre tonnerre" ("thunderstone"), in the Republic of Hayti. These names in themselves point to a belief in a celestial origin of the celt; and so firmly fixed is this class of name in the mind of the present-day inhabitant of the Antilles, that he fails to recognize a celt by any other name. The writer was once told by a gentleman who desired to make a collection of celts, that he visited Nassau in the Bahamas for two winter seasons, and made diligent inquiries for specimens, giving elaborate technical descriptions of celts to the negroes he interrogated, but to no avail. Finally a white resident told him to inquire for "thunderbolts," and within a short time he succeeded in obtaining several good specimens.

The idea, then, that these stones drop from the skies during a thunderstorm is so firmly fixed in the mind of the Antilleans, that no amount of reasoning will convince them to the contrary. At first,

when the writer came across ideas of this kind, he attempted to persuade the negroes that celts could not possibly have been formed in this manner, but it did not take him long to find out that this was energy wasted. One particular instance deserves recording, as illustrating that there are certain limits above which the African mind cannot rise. A Haytien physician who had studied at the Sorbonne in Paris, and who undoubtedly was a clever surgeon, also was imbibed with the idea that celts were "thunderstones;" and despite the fact that the writer argued with him and talked to him for a considerable length of time on the principles of physics, chemistry, and meteoric phenomena, the physician in the end was still unconvinced. Finally, on being shown a ceremonial celt (i.e., a celt upon one side of which was carved in low relief the squatting figure of an aboriginal deity), and asked how a thunderstorm could have produced this upon the surface of the stone, the physician said this might have been carved upon it by an Indian *after* it had fallen from the skies.

The superstitions about celts do not differ materially throughout the West Indies, but it was in the Bahamas and in Jamaica that the writer collected the greatest number of these. This, however, may be due to an insufficient knowledge of Spanish and the French "patois" spoken in Hayti. The negroes of Jamaica, the Bahamas, Cuba, Hayti, and Santo Domingo, all agree that celts are produced by thunderstorms, that they drop from the skies, and penetrate the earth to a depth of seven feet. This depth never varies in their recitals, no matter on what island the story is told, which is somewhat remarkable; and the thunderstorm idea is so firmly fixed, that the writer has frequently been pointed out houses and cocoanut-trees struck by lightning, with the assertion that, if he dug down seven feet, he would undoubtedly come across one of the stones he was so anxiously inquiring after. Then, again, the "thunderbolts" re-appear on the surface of the earth after seven years, a period of time which also never varies; and on several occasions the writer asked his informant if the stone worked itself towards the surface at the rate of a foot a year. This proved too deep a problem to the native mathematicians.

What undoubtedly corresponds to the northern idea that "lightning never strikes twice in the same place" is the Antillean superstition that if one keeps a "thunderbolt" in the house, this is an effective guard against the building being struck by lightning. This is one of the reasons why it is occasionally hard to make an owner part with his stone, for, so he argues, what would in the future protect him against being struck by lightning if he sold it? On many of the small sailing-vessels that gain a precarious living collecting sponges on the Bahama banks, a celt is kept on board for the same purpose. On one or two occasions the writer even came across negro families, which,

for better protection and to guard from loss, had carefully buried a "thunderbolt" under the doorstep of their abode.

The West Indians have a very simple way to determine whether or not a stone is a "proper thunderbolt," to use a Jamaica negro expression. This is to tie a thread firmly around the middle of the celt, and then to suspend it over a lighted candle or the fire. If the thread does not burn or break, the "thunderbolt" is genuine. Strange to say, this test is universally acknowledged to be infallible throughout the northwestern part of the West Indies; and the writer has collected many celts which still show the stone somewhat blackened by the soot of the candle, and a clean line where the thread had been. Needless to say, any smooth stone will allow this test, owing to the physical law that a smooth surface allows the thread to lie closely against the stone with no air intervening; in consequence of which combustion of the thread cannot take place for some time; in fact, not until the stone itself is hot enough to burn the thread. Many and bitter were the disappointments of the negroes when they offered the writer ordinary smooth pebbles for sale, vowing that they were "proper thunderbolts" because the thread did not burn.

"Thunderbolts" also are endowed with wonderful medicinal properties, if one can believe the West Indians. In case of stomachic pains, generally due to too much indulgence in salt fish after a long period of semi-starvation, there is nothing so good as to lay a celt upon the seat of trouble. If at the same time a little water is drunk in which a celt has been steeped, the trouble is almost sure to disappear. Strange to say, a celt is also supposed to be an excellent means of keeping water cool, and for this purpose is often kept in the earthenware water-jar found in so many negro cabins. It is a wonder, therefore, that stomach troubles occur at all, as the water in which the celt is steeped is drunk constantly, and should therefore act as a preventive against this affliction. This, however, is a problem which the writer will not attempt to solve. The fact remains that he has often surreptitiously fished around in the water-jars of such cabins as he happened to visit, in order to try and find celts, frequently with the most surprising success.

It would also appear that celts are held in esteem by the "obiah-men" of Jamaica and the "voodoo-priests" of Hayti, although the writer was never able to discover to what particular purpose these stones served the native witch-doctors. Any inquiry on this subject was immediately met with the most stubborn silence and a pretence of stupidity, which could not be penetrated. During a stay in one of the smaller towns in Jamaica, the writer heard of the arrest of a man suspected of the practice of obiah, for which there is a very heavy penalty in this colony. Being anxious to discover what the prisoner

had in his possession in the way of native poisons, love-philters, etc., the police-sergeant was interviewed, and the writer was willingly shown the obiah-man's outfit. This consisted mostly of a few small bottles filled with insects, powdered earth, etc., a few colored rags, a small coffin fashioned out of wood, and a perfect specimen of a petaloid celt. The sergeant could not — or would not, which is more likely — tell what purpose the "thunderbolt" served in the outfit of the witch-doctor, but was willing enough to donate it to the writer. Most likely the stone was used as in the Bahamas and elsewhere, to "cure" the sick. In Hayti, also, the "voodoo-priests" attach great value to these stones; but, as it is not safe to make too many inquiries in this country regarding the practices of the native medicine-men, it is probable that this mystery cannot be cleared up.

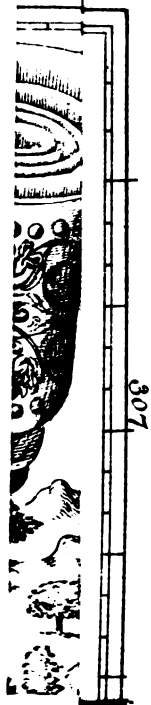
Perhaps the most curious of all beliefs was told the writer by one of his boatmen in the Bahamas. This sailor at one time had served as a coal-passer on a small steamer, and in consequence regarded himself as a quite efficient engineer. On one occasion, when the subject "thunderbolt" was under discussion, he told the writer that these stones contained so much "electric" that if they were pulverized, they would furnish enough power to run the largest engines. This, however, must not be taken as a typical superstition, but rather as a proof to what heights the imagination of a negro mind can ascend.

It is likely that there are still other superstitions about celts, although the writer knows of no others from the West Indies. A few authors — notably Dr. J. W. Fewkes in his "Aborigines of Porto Rico," and Frederick A. Ober in "The Storied West Indies," "In the Wake of Columbus," and a few other works — have briefly noted the fact that celts were named "piedra del rayo" and "thunderbolts." It must also be added here, that, besides a superstitious value, the native West Indian also attaches a monetary value to stones of this class. It is not unusual to find that some of the finest specimens bear marks of having recently been broken. Whenever an archæologist remains in one place for any length of time, and the negroes hear that he is steadily purchasing celts, they begin to think that the stones must contain something that makes them valuable to the white man. In order to find out what this may be, they smash up a celt or two to investigate whether or not the stone contains gold or some other precious metal, — an investigation which, needless to say, results only in disappointment. But the breaking-up of one or two stones does not convince; and the writer well remembers where he had been in one spot for over two weeks, and after a while every single celt brought in for sale bore evidence of this mutilation. It was then patiently explained to the negroes that broken "thunderbolts" were *not* purchased; and, as by this time they had no entire ones left, the would-be vendors betook themselves to their homes, "sadder and wiser men."

In conclusion, one more illustration of the value which the negro sometimes thinks his celts have. The writer and a Mr. C. V. Spicer, who was assisting in some archæological work in the Bahamas, were once lying anchored off a small settlement called Snug Corner, on Acklin Island, on a small sloop belonging to the Heye Museum, which was used for the Bahama work. The weather was quite squally, with a considerable amount of rain, and it was decided to retire early. Just before going to bed, a hail was heard; and within a few minutes a small, open sail-boat came alongside, with a crew of three men. The writer was then told that this boat had been all day long coming from the south point of Acklin, some twenty miles away; and it was evident that the trip had been wet and disagreeable, judging from the appearance of the three men. On inquiring what the men wanted, the writer was informed that they had three "thunderbolts" for sale, which, on examination, proved to be of the usual type, with a value of twenty-five cents apiece. In view of the fact that the three men had had an unpleasant time (the writer not knowing then that the trip had been made for his special benefit, but thinking that the three men were on their way to a more northerly settlement), they were offered thirty-six cents apiece for the stones. This offer was quickly declined; and never did the writer see a quicker change from the usual negro grin to the most utter African despondency. Mr. Spicer by this time was beginning to feel sorry for the men, and ordered them some supper, they having eaten nothing all day long during their "beat" against the wind from the south point of Acklin Island to Snug Corner; and it was only after the small boat had again departed into the night that the mystery was solved. During their supper the men told the crew of the Heye Museum sloop that they had come up especially from South Point to sell the celts to the writer, that they had been informed that the writer had paid fifty dollars apiece for "thunderbolts" at Fortune Island (a neighboring island), and that they expected to return to their village with at least a hundred and fifty dollars. This had excited their cupidity to such an extent that they had undertaken the long trip to windward on a stormy day, having probably kept themselves warm and comforted by thoughts of soon having this money to spend; and the writer's offer of thirty-six cents apiece for the stones was therefore all the more disheartening.

An occurrence of this kind was unusual, however, although it happened often that the possessor of a celt began by asking a pound sterling (about \$4.80) for his property. This amount he steadily diminished, and in the end was glad enough to obtain from twenty-five to fifty cents for a stone which had cost him nothing in the beginning, save the trouble of stooping over and picking it up.

HEYE MUSEUM,
NEW YORK CITY.



THE NANTICOKE COMMUNITY OF DELAWARE

BY

FRANK G. SPECK

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INTRODUCTION

DURING each winter and spring since 1911 I have spent as much time as was available in ethnologic work among the mixed-blood descendants of the Nanticoke Indians living in several communities in southern Delaware. Dr W. D. Wallis, at the instance of the University Museum, University of Penn-

sylvania, also had a share in the commencement of this investigation. These people, who occasionally have been reported in papers and journals,¹ form two bands, the nuclear band living in Indian River Hundred, Sussex county, the other, supposedly an offshoot, residing at Cheswold, Kent county. The members of the bands together are roughly estimated to number about 700. These people form self-recognized communities, with their own schools and churches, and possess a decidedly endogamous tendency which refuses particularly to recognize marriage with negroes. They style themselves variously "Nanticokes," "Moors," and "Indians." This feeling of local seclusiveness is a marked trait among these people and was noted by Babcock who visited the tribe in 1899 and wrote a short but interesting account of what he saw.²

Physically the community exhibits a great lack of racial homogeneity, the types of physiognomy, color, and hair ranging from the European, the mulatto, and the Indian through all the usual gradations. Some individuals have straight hair, fair skin, and blue eyes; some have brown skin and kinky or curly hair; others have broad faces and straight, black hair, the color and general appearance of Indians. It is common to find these characteristics divided irregularly among the members of the same family.

An interesting tradition current among the members of the band is that they are descended from a crew of Moorish sailors who

¹ See James Mooney, "Siouan Tribes of the East," *Bulletin 22, Bureau of American Ethnology*, pp. 12, 51, 80, Washington, 1895. Mooney, "The Powhatan Confederacy, Past and Present," *American Anthropologist*, 1907, vol. ix, pp. 129-152. *Encyclopædia Britannica*, Eleventh ed. (1910-11), p. 948, article "Delaware." "In Indian River Hundred there lived a community of people—many of whom are of the fair Caucasian type—called 'Indians' or 'Moors': they are now quite generally dispersed throughout the State, especially in Kent and Sussex counties. Their origin is unknown, but according to local tradition they are the descendants of some Moorish sailors who were cast ashore many years ago in a shipwreck; their own tradition is that they are descended from an Irish mother and a negro father, these children having intermarried with Indians of the Nanticoke tribe. They have where practicable separate churches and schools, the latter receiving state aid." Brinton, *The Lenâpé and their Legends*, p. 22-25, Phila., 1885, gives a review of Nanticoke history and some notes on their ethnology.

² William H. Babcock, "The Nanticoke Indians of Indian River, Delaware," *American Anthropologist*, n. s., 1899, vol. i, pp. 277-282. The author does not give any ethnological information, but he describes the appearance of the people.



NANTICOKE TYPES

(THE UPPER PORTRAITS ARE FULL-FACE AND PROFILE OF THE SAME BOY)

were shipwrecked near Indian River inlet, escaped to the shore, and intermarried with the Indians who were living there. This story is well known in the region and is repeated with several variations. One states that on board the wrecked vessel was an Irish princess; another claims that the vessel was owned by a Moorish prince; another that the Moors were pirates from the Spanish main, and to this they attribute their local name of "Moors." As important as this story seems to be, I was unable to secure any consecutive version worth recording as testimony in the words of the narrator. Those who know of it give only the general facts as mentioned above. A few discredit the story altogether. On the whole, however, I am inclined to credit the general claim that Moorish sailors might have been shipwrecked on the treacherous shoals off the southern Delaware coast and come ashore to the shelter of the Indian natives. When this might have happened it is difficult to say, unless we assume that it was during the years of piracy on the high seas in the seventeenth and the early part of the eighteenth century (1650-1720 approximately). The importance of the term "Moors" in connection with the pirates of the West Indies suggests relationship in this case. (See Appendix.)

As may be observed in the portraits accompanying this paper (pl. II-XI) the appearance of even the most negroid of these people is quite different from that of the common Southern negro type. They are much more refined in appearance, with thinner lips and narrower noses. Heckewelder¹ says that the Nanticoke were distinguished from neighboring tribes by a darker color. Writing at this date, if we assume the story of the Moorish admixture to have some foundation in truth, one does not have to seek far for an explanation of the dark complexion of the Nanticoke.² It would seem that the tribe bore evidence of an African admixture before leaving Maryland, which would be before 1748, at the latest. The "Moor"

¹ J. G. E. Heckewelder, *An Account of the History, Manners and Customs of the Indian Natives who once Inhabited Pennsylvania and the Neighboring States*, Phila., 1819.

² The Canadian Nanticoke are still conscious of their reputation among the Iroquois for having a dark complexion. In addition, at the Grand River reserve they are humorously accused of having large feet.

story would then date from about 1700, which is indeed the most likely period for it.

Another question in this connection is, How far might northern African influence have survived in industry and folklore? Family names betray only English origins, with one exception: that of "Bumberry" may indeed possibly be a corruption of *Barbary*.¹ African influence, however, is shown most conclusively by the fact that a list of Nanticoke numerals (1 to 10) recorded by Pylæus, a missionary to the Mohawk in 1780, proved, through the investigations of Dr Brinton,² to be Mandingo or a closely related West African language.

Although the Moors or Nanticoke were included with the "colored people" during slave days, none of them were ever held as slaves. They claimed the right to carry firearms, and in the local court forty or fifty years ago one of their number won a case, arising from the ownership of firearms, by proving himself to be a "native Indian without a drop of slave blood in his veins." In recent years, as the outcome of an effort led by one of the band, Mr W. R. Clark, the Nanticoke have secured legal recognition at the Delaware State capital as Indians and exemption from regulations applying to negroes.

Reverting again for a moment to the question of English ancestry, we find that the band speaks a dialect of English distinct from that spoken in other parts of Delaware and Maryland. In another part of this paper I have noted some phonetic peculiarities and words and expressions peculiar to the community, which with tracing the family names³ may some time afford a clue respecting its

¹ The same family name (*Bounberri*), strange to say, is found among the Canadian Cayuga. The Cayuga are said to have adopted the Nanticoke in 1753. It is just as likely, however, that the name is from Vamberry.

² Cf. *American Antiquarian*, 1887, vol. ix, p. 352.

³ The names of families of the Nanticoke community in Sussex county are here given. They comprise a majority of the inhabitants of the district known as Indian River Hundred, from near Millsboro eastward along the northern shore of Indian river to near Lewes, and northward nearly to Georgetown. These names are: Rogers, Jackson, Wright, Thompson (part negro), Harmon, Street, Norwood, Coursey, Morris, Clark, Johnson, Drain, Moseley, Sockume, Burton, Davis, Bumberry, Layton, Miller, Thomas, Corneans, Hanzier. They have the peculiarity of calling the children by the parents' names, as Levin's Isaac, Noah's Jim, Eliza Ann's Jane, etc.



NANTICOKE TYPES

(THE UPPER TWO AND THE LOWER LEFT-HAND BOYS ARE BROTHERS)

derivation. A comparison of these with the family names and dialectic peculiarities of the so-called Croatan settlement in North Carolina is interesting, because the latter are in a somewhat similar position, being reputed descendants (with little basis of fact, however) of colonists from southern England, conducted to America by Sir Walter Raleigh (1587), who became merged with the natives of the coast. In comparing the vernacular and family names of both communities we find no correspondences.¹

Finally, in discussing the origin of the Nanticoke community we should not overlook the fact that one at least of the older men, Lemuel Sockume, claims that their Indian ancestors were Cherokee. I do not know how to coördinate this assertion with the known facts of the case, unless it be that Cherokee at some time joined the Nanticoke band and left descendants there. Some of them claim also a trace of French blood.²

Unfortunately nothing of the Nanticoke language remains, not even a trace.

Part of my task among these people was the gathering of ethnological specimens. Accordingly a collection of about one hundred objects of industry were obtained from the older families, illustrating life in past generations. This collection is now in possession of the Museum of the American Indian in New York, in whose interest the latter part of the investigation was conducted. The illustrations of objects in this paper are from drawings of the originals in that Museum.

Considering the value that the following fragments of material life and folklore may have, either from the point of view of survivals of Indian culture or as possible secondary independent folk developments, I shall include a few introductory historical references.

¹ An interesting study of the Croatans of North Carolina has been made by H. McMillan, *Sir Walter Raleigh's Lost Colony*, Raleigh, N. C., 1907, pp. 35-36. Cf. also N. E. Fitch, "The First Founders in America, with Facts to Prove that Sir Walter Raleigh's Lost Colony was not Lost," *N. Y. Society of the Order of the Founders and Patriots of America*, 1913, p. 39. Incidentally these authors both refer to the use of the wooden crossbow, an article borrowed from the early explorers and found among the Algonkin tribes as far as the Montagnais of Labrador.

² The family name of Hanzier (pronounced Hä'nzer) is said to be of French origin. Mrs Bumbery says that her grandmother, who was a Hanzier, could speak French.

HISTORY

The Nanticoke Indians of southern Delaware were first encountered in 1608 by Captain John Smith.¹ They then occupied the peninsula between the Atlantic ocean and Chesapeake bay. Smith spoke of them in the following terms:

"We set saile for the maine; and fel with a faire river on the East called Kuskarawaocke. By it inhabit the people of Soraphanigh, Nause, Arsek, and Nautaquake, that much extolled a great nation called Massawomekes . . ."²

"On the east side of the Bay, is the river Tockwhogh, and upon it a people that can make 100 men, seated some seaven myles within the river: where they have a Fort very well pallisadoed and mantelled with barkes of trees. Next them is Ozinies with 60 men. More to the South of that East side of the Bay, the river Rapanock, neere unto which is the river Kuskarawaock. Upon which is seated a people with 200 men. After that, is the river Tants Wighcocomoco, and on it a people with 100 men. The people of these rivers are of little stature, of another language from the rest [referring to the Powhatans], and very rude. But they are on the river Acohanock with 40 men, and they of Accomack 80 men doth equalize any of the Territories of Powhatan, and speake his language; who over all those doth rule as King."³

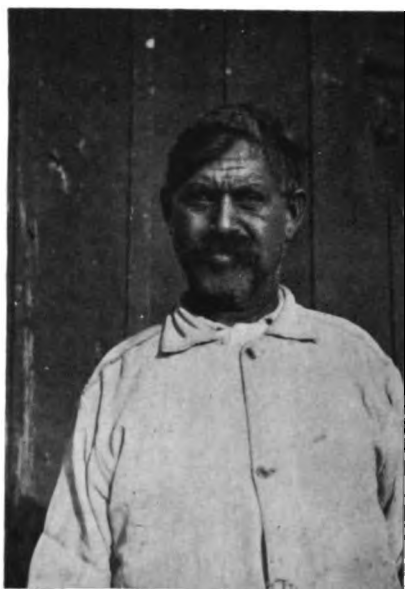
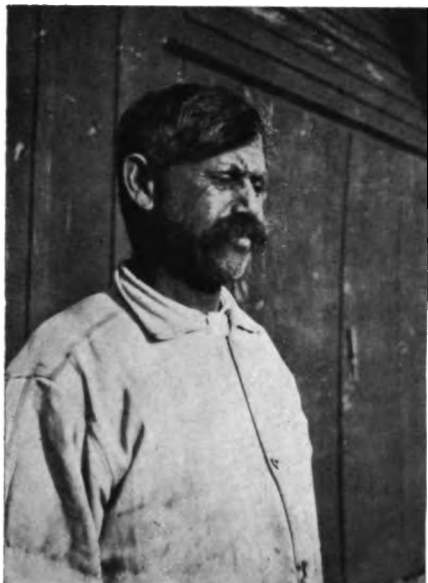
To bring these related matters together as much as possible, John Smith's map is here reproduced (pl. 1).

Subsequently the Nanticoke are heard of through their connection with the related tribes along the Susquehanna and on the western shore of Chesapeake bay. References bearing exclusively on the Indians who remained on the eastern shore are scanty and convey little information concerning their mode of life. From 1641 to 1648 they were at war with the colonists. By 1748 most of the Nanticoke and Conoy of Maryland had moved up the Susquehanna to the Iroquois, with whom they gradually became affiliated. By 1799 the Nanticoke had sold all their land in Mary-

¹ Captain John Smith's Works (1608-1631). *English Scholar's Library*, edited by Edward Arber, Birmingham, England, 1884.

² *Ibid.*, p. 111.

³ *Ibid.*, p. 351. (1607-09.)



NANTICOKE TYPES

(THE UPPER TWO ARE FULL-FACE AND PROFILE PORTRAITS OF THE SAME MAN)

land. Since it is not the intention in this paper to deal with the bands of the western shore,¹ nor with the Nanticoke in general after their adoption by the Iroquois in 1753, we shall have to leave the historical documents and depend on local traditions of the people of the region.²

The last authentic reference, however, to the Nanticoke in their old haunts, and the one to which we are indebted for knowledge of the language, is that by William Vans Murray, who in 1792 sent a few ethnological notes and a vocabulary collected at the Nanticoke village of Locust Neck Town, Goose creek, Choctank river, Dorchester county, Maryland, at the instance of Thomas Jefferson.³ In a letter accompanying the vocabulary he wrote that the tribe had dwindled to nine persons. They lived in "four genuine old wigwams thatched over with the bark of the cedar." They were governed by a "queen," Mrs Mulberry. The rest had removed "to the Six Nations They went to the Senecas often." A note to the vocabulary adds that Wyniaco, their last

¹ The inhabitants of the Maryland shore probably formed a separate band of the Nanticoke, differing in some details from those of the eastern shore. An alliance existed between them as late as 1660, according to Colonial records. Since the Canadian Nanticoke came mostly from Maryland proper, they should be classed as a separate band, or at least as one comprising several dialects. One of these, if not the predominating one, was the Conoy or Kanawha, judging by a comparison of the older Nanticoke material with a vocabulary from the present Canadian division of the tribe, and also from a tribal synonym by which the latter are known as Ganawagohono (Cayuga), "swamp people" (Kanawha).

² During the winter of 1914 I visited the Nanticoke incorporated with the Six Nations of Iroquois at Ohsweken, Ontario, where several hundred descendants still retain their identity as a body in the League. The ethnological results of this trip, with a Nanticoke vocabulary, are being prepared for a special paper on the emigrant portion of the tribe. The Nanticoke in Ontario were greatly interested in learning through me of their kinsmen in Delaware, of whom they had heard occasionally. Some family names are common to both bands. The last actual contact between them, according to the memory of the Canadian Nanticoke, was in the middle of the last century, when several families from the South, presumably from Delaware, were refused admission into the Canadian band on account of their dark complexion. The name of one of these families was Burton, according to memory, which incidentally corresponds with a common family name of those still in Delaware. In 1857 the Canadian Nanticoke sent a chief (Cornelius Anderson) and two delegates to Maryland to look up survivors, but they found none there.

³ D. G. Brinton, "A Vocabulary of the Nanticoke Dialect." *Proceedings of the American Philosophical Society*, vol. XXXI, 1893, pp. 325-333.

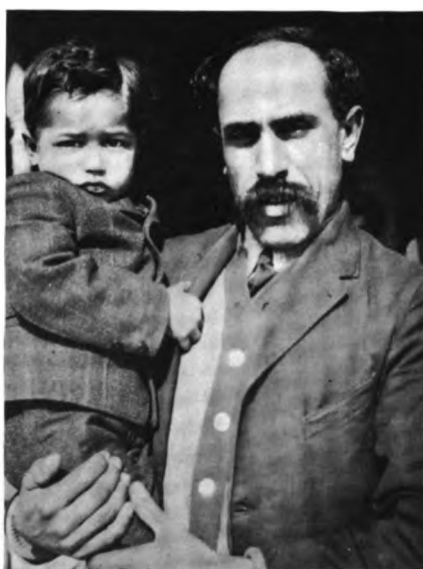
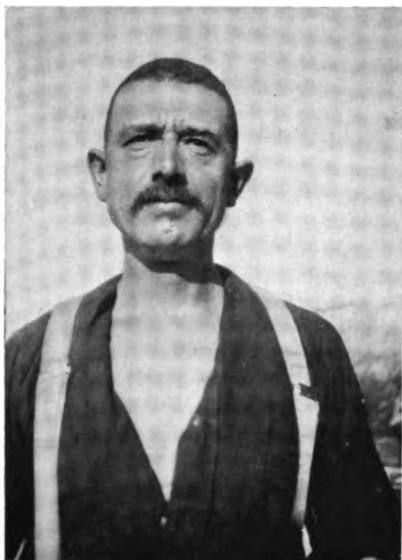
"king," had died about 75 or 80 years before and that his body was kept preserved in a mortuary house. The custom of preserving the bones of the dead was early recorded of the Nanticoke. The names of two Nanticoke villages are given in this notice, "*Amanamo quun*, the name of the Indian town of Locust Neck. *Mattappenen*, the name of the Nanticoke Indian town." Beverley¹ in 1722 mentioned the principal village of the tribe as Nanduge, with 100 inhabitants, ruled by an "empress."²

Regarding tribal identity and history, a few interesting fragments of tradition survive among the people. The Nanticoke are said to have inhabited the coast and inlets no farther north than Indian river. Inland, however, they ranged westward across Chesapeake bay. Evidently the present remaining descendants of the tribe at Indian river were the nucleus of those who stayed in Delaware after the general break-up of national life, before 1748. The country north of the Indian River district, according to surviving tradition, was neutral ground between the Nanticoke and the Delawares proper, who, the former assert, were not always on the best of terms with the Nanticoke of Indian river. This would make the ancestry of the Cheswold branch of the Indian remnant in Delaware not fundamentally Nanticoke, but Delaware. Of course it should be remembered that intermarriage and removals have been frequent between the two bands, so that now, to all intents, they are practically the same, differing only in the degree of white and negro intermixture. According to Mr Clark's testimony, early in the last century many families emigrated from Indian river to the west, for the purpose of joining some tribes nearer, or across, the Alleghanies. This probably refers to the general Indian emigration from the coast to the adjacent slope, during the middle of the eighteenth century, with the Delawares and others.

Subsequent to this movement representatives from the departed band occasionally returned to Indian river to visit their friends and relatives; particularly to visit old Mrs Lydia Clark, the grand-

¹ *History of Virginia*, 2d ed., London, 1722. Possibly *namóq'wan*, "fish catching," and, *nadápenan*, "landing place."

² Among the Canadian Nanticoke the term "emperor," denoting head-chief, is still in use.



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(THE UPPER TWO ARE PORTRAITS OF THE SAME MAN. THE LOWER LEFT-HAND PORTRAIT IS THAT OF HIS SON)

mother of our chief informant, Mr W. R. Clark, who was then the only person who spoke the Nanticoke language and who wore in part the native costume. After her death, probably between 1840 and 1850, these Indians did not come again, and the Indian River remnant was left without communication with its kin. Again, however, a number of families emigrated from Indian river.¹

These seem to have been the last important events in the history of the community, excepting the occasion of a church quarrel over the admission of negroes to church and school privileges, which resulted in the division of the band into two factions. The original exclusive party is still known as the Indian River or Warwick Indian community, the seceders, who admit social rights to outsiders, calling themselves the Harmonia people. These later distinctions, however, are of minor importance.

PHYSICAL CHARACTER OF THE REGION

A few words concerning the physical character of the Nanticoke country will not be out of place. The surface is extremely flat; the land a sandy bottom without stones, a fact that becomes important when it is remembered that all the stones (steatite, jasper, quartz, chert, etc.) used in making implements by the original natives had to be imported from the western shore of Chesapeake bay or overland from north of Dover. The geographical features of the section are characteristic of the Atlantic coastal plain to which it belongs, not differing noticeably from the Carolina coast.

Tall, columnar, yellow pines and spruce pines form the forest growth that still covers much of the Indian River country, but this is interspersed with oak, sassafras, holly, maple, cedar, dogwood, and smaller trees. In spring the white dogwood blossoms show brightly through the dark pines, but give place to the dryer green-

¹About 1855 some fifty members of the Sockume, Miller, and Norwood families moved to San Francisco, California, where their descendants still live. In 1865 members of the Johnson and Harmon families moved to Blackwood Town, New Jersey. For many years there were Nanticoke colonies in Gloucester, New Jersey, and Philadelphia. In 1870 about fourteen Clarks, Millers, and Johnsons moved from Gloucester to near Detroit, Michigan, and in 1887 six of the Thomas family moved from Philadelphia to Nova Scotia.

ness of midsummer. The leaves fall late in October or early in November. More or less continued cold weather comes by December and lasts through February, during which snow is common, though not remaining on the ground for more than a day or two at a time. Frost does not penetrate deeper than a few inches, and does not remain more than a few weeks. Seasons during which Indian river freezes over for more than a few days at a time are rare. The summers, as might be expected in this locality, are hot and humid. Mosquitoes are very troublesome and cause considerable ague, as one might suspect from the number of herb cures for this malady to be listed later.

AGRICULTURE AND FOOD

In the present-day life of the community no industry shows more surviving native characteristics than that pertaining to corn. Of the four varieties of native corn raised, two of them, the white and the yellow, are early; the others, namely, "sheepshank," or flint, and popcorn, are late. Incidentally the same varieties were recorded among the Virginia Indians by Robert Beverley in 1722.¹ The "sheepshank" is planted late nowadays, mostly in rather poor or waste ground. After the sandy fields have been plowed, sowing begins, about May 10 to 15. Some superstitions are observed in the planting: for instance, corn should not be sown while the wind is from the east; it should be sown before noon, and when the "moon is filling," that is, when it is on the increase. Also in regard to agriculture, we learn that potatoes and wheat must be planted in the light of the moon, and tomatoes should not be planted while the wind is easterly. Furthermore, watermelon-seed should be sown before sunrise on May 12.

Returning to the cultivation of corn, we encounter an interesting implement known locally as a "suckerin' cane," used during the early season. This is a crooked stick of oak with a natural bend forming a grip, the whole averaging 22 to 26 inches in length (fig. 1). This implement is employed by the men, who go through

¹ See Willoughby, "The Virginia Indians in the Seventeenth Century," *American Anthropologist*, N. S., 1907, vol. 9, no. 1, quoting Beverley, *History of Virginia*, 2d ed., 1722, p. 18.



NANTICOKE TYPES

the fields pulling out the surplus sprouts in the corn-hills. They rest their weight upon it like a cane, when they bend over and pull out a sprout. The sharp end is used also to poke holes in the hills where other grains of corn are needed to be planted. This is manifestly the old planting-stick surviving in serious use.

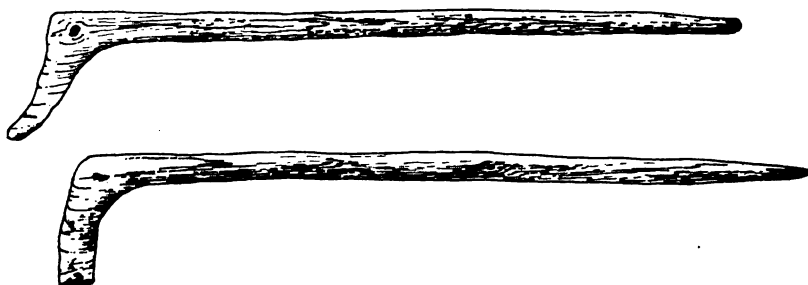


FIG. 1.—“Suckering” canes.

The next operation deserving notice is the “topping” and “stripping” which take place when the kernels have formed sufficiently and the milk will not run when, as a test, the kernel is cut with the finger-nail. The topping consists in cutting off the stalk above the uppermost ear, while stripping refers to cutting off all

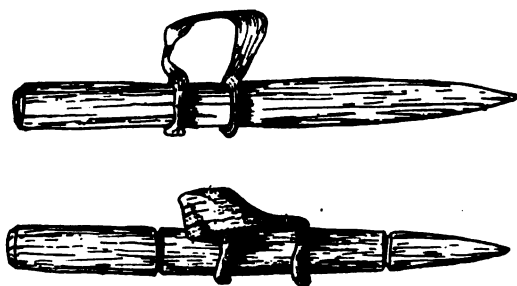


FIG. 2.—Corn-husking pegs.

the leaves. This practice is an old one among the farmers throughout southern Delaware, and locally is attributed to the Indians. The tops and leaves are used as fodder for stock in this region, where little or no grass for hay grows. When the corn is to be harvested, the men enter the fields and husk the ears, throwing them into heaps, which are then gathered in large baskets by

children and helpers. A husking-peg of hard oak, five to six inches long (fig. 2), with a leather finger-loop, is used. This article is practically the same as that found among the Iroquois, Pamunkey, Mohegan, and other Southern tribal remnants. Finally the corn crop is stored in the large characteristic corn-cribs, made of logs (pl. xv), which may possibly preserve some aboriginal constructional features, since the entire corn industry is derived from the Indians, and many of the implements used with it have survived in one form or another.

In the first stage of the preparation of the corn for use, an interesting device for shelling the corn from the cob is found. This consists of a large, hollow log from a gum tree, 29 in. high and 27 in. wide, with walls $1\frac{1}{2}$ in. thick. Its widest part is uppermost, with a row of eleven wooden bars, $1\frac{1}{2}$ in. thick, reaching across the cavity like a grating, a foot from the ground or lower edge. The husked ears of corn are put in the upper cavity and beaten with a pestle made by fastening an iron wedge into a notched staff. The loosened kernels fall through the grating into the lower compartment, from which they are shoveled out through the aperture. One of these old corn-shellors is shown in operation in plate xvi. This apparatus is known to have been used by the Nanticoke from the time of their earliest remembrance. One wonders if it is a strictly aboriginal invention, since nothing like it has been reported elsewhere on the continent. The natives, of course, in preparing small quantities, sometimes shell the corn by grating it with another cob.

Next the usual corn mortar and pestle are used to pound the corn into grits or flour. The mortars of the Nanticoke are evidently of native origin. Nearly every family possesses one. They are all of one type (pl. xxi), tapering toward the base. The hominy mortar is made of gum-wood. The outer surface is shaped with an axe; the cavity is made by drilling a deep hole into the top of the log and putting fire therein, which is replenished until it has burned near enough to the edge. The pestle is the same as the one above described. The kernels of corn are pounded to grits in the mortar, the chaff and hulls being separated by scooping up the



NANTICOKE TYPES

(THE LOWER TWO ARE FULL-FACE AND PROFILE PORTRAITS OF THE SAME WOMAN)

grits in a basket and pouring them again into the mortar from above, or from one basket to another, allowing the wind to blow the waste away. Sieves seem to have been unknown. By repeating the pounding and pouring operation, the corn is ground and cleaned until fit to be used as hominy or for bread. Smaller mortars of the same shape, though some straight-sided ones are found, are employed for pounding coffee and medicinal plants (pl. XXI). In shape these mortars are unlike the plainer ones of the Southern tribes, and they are not found in use among the whites. Some have cavities in the bottom for cracking hickory-nuts.

Following are the dimensions (in inches) of Nanticoke wooden mortars in the Museum of the American Indian:

MATERIAL	HEIGHT	WIDTH AT TOP	NARROWEST PART	BASE	DEPTH OF CAVITY	THICKNESS OF WALL AT RIM
Gum.....	29	12	7	11½	15	1½
Gum.....	32	16	8	15½	12	1½
Gum.....	14	7½	4	7	8½	½
Locust.....	17	7	4½	7½	4	1
Gum.....	12	6	2	6	6	¾
Gum.....	33	13	4½	13	12	1
Gum.....	34	12	6½	11	18	1½

The stirring paddles used by the Nanticoke when making mush or pone are of two general sizes. The longer ones (fig. 3) are 28

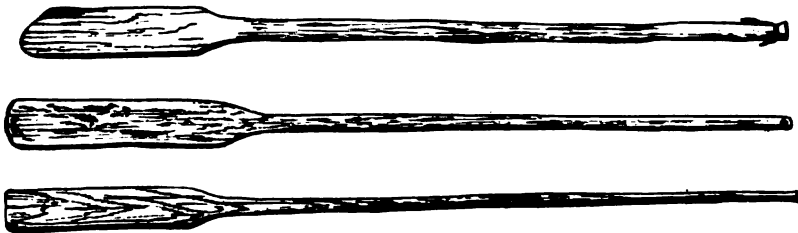


FIG. 3.—Large stirring paddles.

to 30 in. long, with blades 1½ in. wide, and are made of white oak or of yellow pine. The smaller paddles are from 17 to 19 in. long (fig. 4) and are much used nowadays in making butter. Although the stirring paddles are extremely plain, the nearest people whose

paddles they resemble, excepting the remnant of the Powhatan Indians of Virginia, are the Cherokee of North Carolina, whose paddles are identical.

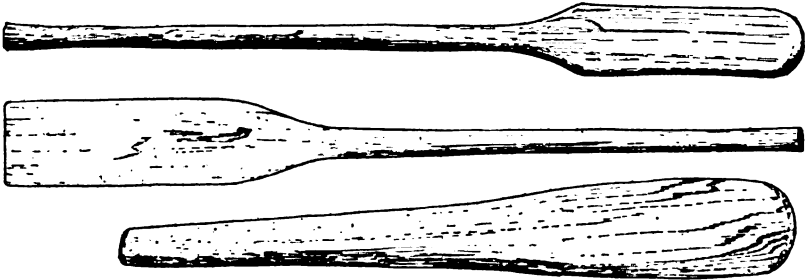


FIG. 4.—Small stirring paddles.

A large, cumbersome, spoon-like ladle, evidently of cypress (fig. 5), was also used for stirring food in a cauldron. An individual spoon obtained from a Nanticoke near the ocean at Lewes, is made of red oak, with a bowl 3 in. wide and a handle 10 in. long. It was used for eating corn and beans.

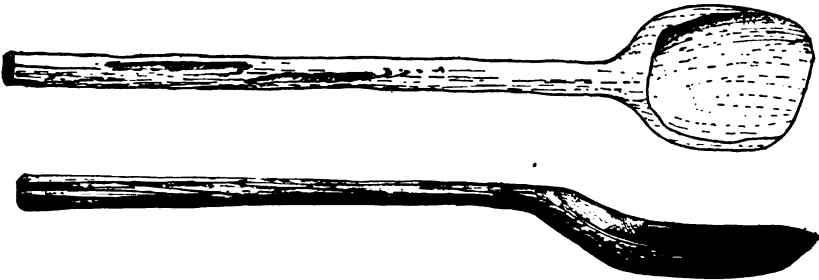


FIG. 5.—Wooden ladles for stirring.

Some old-fashioned foods of Indian origin have survived. Among these is found the "ash cake"—a disc of corn dough, six inches or so in width, wrapped in large, damp leaves and placed in the ashes of a dying fire. Another food is "johnny-cake" (journey cake), made of corn flour and water mixed to dough and spread upon an oak board which is then tilted obliquely on its side before an open fire until the cake is browned. A very old "johnny-cake" board, 18 in. long, 4 in. wide, and $\frac{3}{4}$ in. thick, is shown in figure 6.



NANTICOKE TYPES

(THE UPPER TWO ARE PORTRAITS OF THE SAME WOMAN)

Johnny-cake was the staple of these Indians in former times, and with roasted or boiled meat and fish constituted the chief diet.

"Pone,"¹ the next important food, consists of corn-meal salted to taste, mixed with water, placed in a vessel, and cooked in an oven over night. This makes a nourishing but rather heavy loaf, which is very popular when eaten with cane molasses.

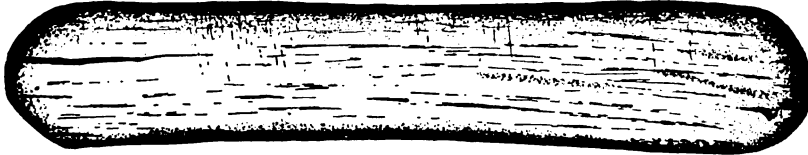


FIG. 6.—Johnny-cake board.

According to another native recipe meat is mixed with hominy and boiled in the form of a stew. The meat of all kinds of wild game is stewed or fried. Muskrats are made into a stew, as are also raccoons and opossums.

FISHING AND HUNTING

Indian river abounds in fine, edible fish, many of which come in as they enter Delaware bay to ascend to their spawning waters. Among the chief fish are shad, herring, drum, perch, and latterly carp. Fishing, indeed, forms one of the leading activities of the Nanticoke, and is followed as a business by some of them. Among the devices for taking fish, some are probably of aboriginal origin while others have been modified by modern usage.

The Nanticoke use the eel-pot, so characteristic of all the tribes south of the St Lawrence along the Atlantic coast, making it of pine and of oak splints from half an inch to an inch wide in the simple twill weave, with an indented bottom to serve as an entrance, the inward projecting standards preventing eels or other fish, having once entered, from passing out again. The eel-pots are between 18 and 26 in. in length, about 9 in. wide at the bottom, and 5 in. at the top. Several specimens of pine and of oak splints are shown in plate XIX. The opening at the top is here

¹ This term is probably derived from old Nanticoke *a'pa'n*, "bread" (Canadian dialect).

generally closed with a wooden plug. The eel-pot is sunk with stones on the bottom along the shore, or is put at the mouth of a fyke, to be described later.

Fish-nets are found in nearly every family of the tribe living within a mile or so of the river. They are now made of the cord of

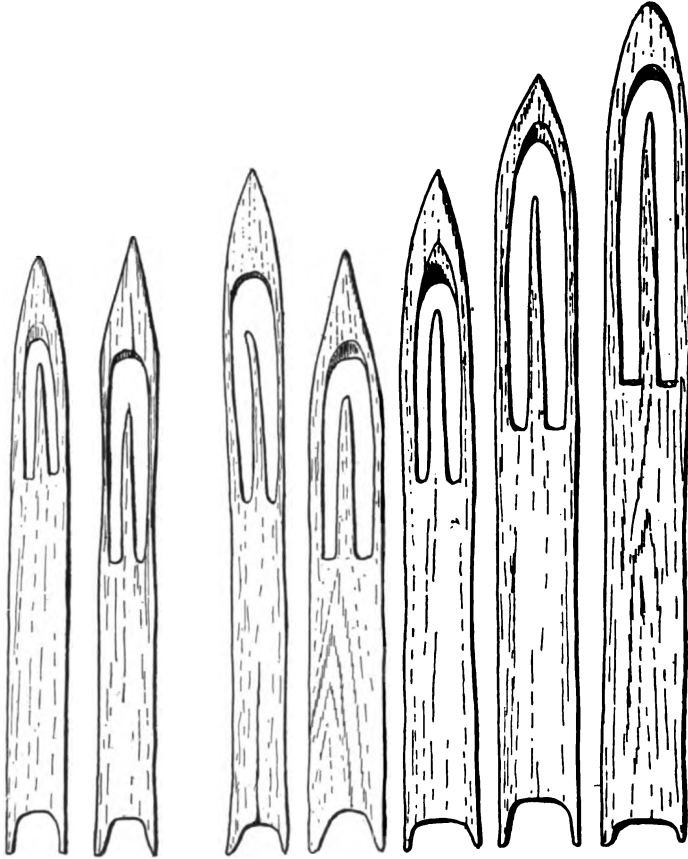


FIG. 7.—Netting-needles. The first two examples are for making herring nets, the others for making nets for sturgeon, drum, and shad.

commerce. The netting-needles and mesh-sticks are of the form shown in figure 7. The needles range from 6 to 9 in. in length, and from $\frac{1}{2}$ to 1 in. in width. They are all of oak, with the tongue from $\frac{1}{2}$ to 2 in. long. The mesh-blocks, of oak or pine (fig. 8),



NANTICOKE TYPES

(FULL-FACES AND PROFILES. THE UPPER PORTRAITS ARE THOSE OF THE GRANDDAUGHTER OF THE WOMAN ILLUSTRATED AT THE TOP OF PLATE VIII)

range from 1 in. to 3 in. wide, and are generally $3\frac{1}{2}$ to 4 inches long and $\frac{1}{2}$ inch thick. The smaller blocks are for perch and herring nets, and the larger for carp, shad, drum, and the like. The net-knot, or becket, is made by taking a turn of the cord under the mesh-block and up to the top side where it is held fast by the thumb pressing the block; then a loop is thrown to the left, the needle passed through the mesh-opening just above, enclosing the cords, and the knot drawn taut.

It should be noted that the netting-needles made by the Nanticoke, strange as it may seem, differ in one respect from those made by the neighboring white and black people. Among the latter, the open space and tongue of the needle are somewhat longer. This difference I have tested by observing a number of specimens both from whites and negroes in southern Delaware. Incidentally, the shape and proportions of the Nanticoke needles are practically identical with those observed among the northern Atlantic and Canadian Algonkin.

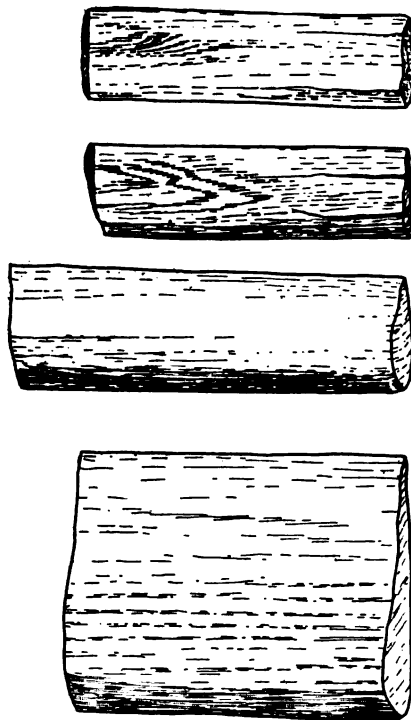


FIG. 8.—Measuring blocks for making nets.

The nets are used for dragging across the channel of the river, as set or gill nets, and for fykes. A party of Nanticoke take one of the nets in a boat and row across Indian river at one of its narrower points, having left a man on shore with a long rope attached to the net. They then put the net in the water and row back to the shore whence they started. Next the man left on shore below, and those pulling farther along, gradually haul the net, like a narrowing

bag, until it is drawn out upon a sandy beach between the two parties, where all the fish that have been drawn into it are secured. Plate XVIII shows a party engaged in seining herring by this method in April, 1912.

For fishing in the river a fyke is commonly employed. This is made on the same plan as the basketwork eel-trap, the fish entering a funnel-shaped enclosure of network, and being prevented from getting out by the difficulty of finding their way between the strings which they passed in entering. The fyke generally has three hoops

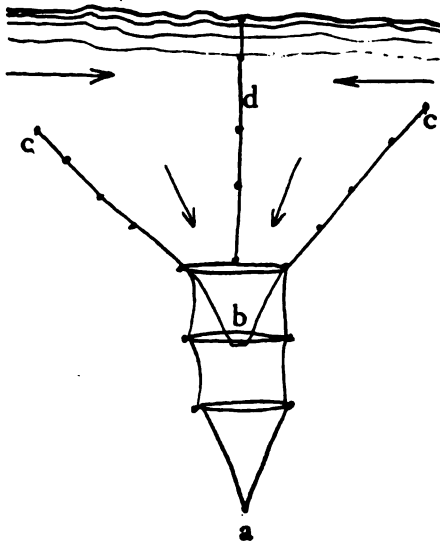


FIG. 9.—Fyke set along shore, looking downward.

of wood which form the tapering enclosure, and two wings of net, branching out on each side, with a long central line of net running from the mouth of the fyke to the shore. The fykes vary in size. The smaller have hoops 29 to 32 in. in diameter, an enclosure not more than 6 or 8 ft. long, with wings about 15 ft. in length. The larger fykes have hoops 5 or 6 ft. in diameter, an enclosure of 10 to 15 ft., with other dimensions in proportion.

The floats and sinkers for the wings and runner of the fyke are the same as for the draw-nets. Figure 9 shows how the fyke is set facing the shore, with its wings and runner to guide the fish, which move along close to the shore, up or down stream, into the enclosure.

The fyke and its runners are held in place by poles driven into the sand of the river. The arrows indicate the direction in which the fish swim; *a* shows the rear opening of the fyke, which is closed by tying, the fishermen going out, in boats, with open-bottom baskets, lifting up and opening the fyke, and transferring



NANTICOKE CHILDREN

the captured fish to the baskets; *b* is the tapering entrance, *c, c* the wings, and *d* the runner. The distance from the shore varies. Fykes of heavier netting are used for terrapins, the collection in the Museum of the American Indian containing a terrapin fyke 8 ft. long, of heavy cord with an inch mesh. The lower left-hand figure of plate XVIII shows a scene along Indian river in February, 1912, with a fyke, indicated by the poles, frozen beneath the ice.

From one of the old men of this community I obtained a fish-hook with artificial bait and hand-line which he had made for himself so cleverly that it seems worthy of treatment as a product of native ingenuity. The whole device, except the hook itself, is of home make (fig. 10). From a piece of flat bone he has whittled the semblance of a small bait fish. A wire leader connects this, the hook, and the line. The float is of pine, plummet-shaped, and the line is wound on a corncob reel. This device the maker was using with great success in fishing for carp. He claimed to have thought of this arrangement by himself, the blind cupidity of the fish when hungry having suggested the artificial bait.

As adjuncts to the nets, there

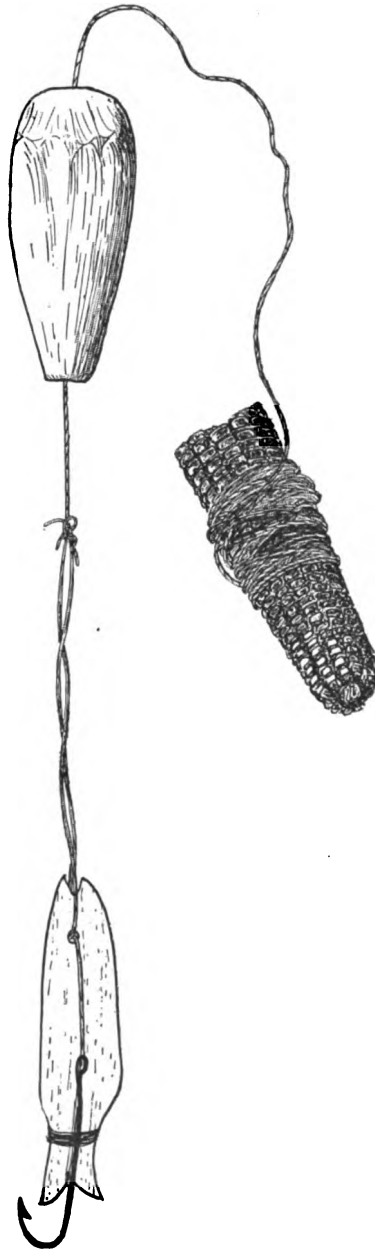


FIG. 10.—Fish-hook with artificial bait.

are wooden floats made of pine, in the several shapes illustrated (fig. 11, *a*, *c*), from 2 to 5 in. long and 2 in. wide. Stones are used for sinkers whenever they can be obtained in this sandy region; otherwise small bags of sand are ingeniously substituted. For hand-line fishing the floats are neater and somewhat pear-shaped (fig. 11, *b*).

While agriculture and fishing were so prominent in the life of the Nanticoke, hunting seems to have been a minor activity in

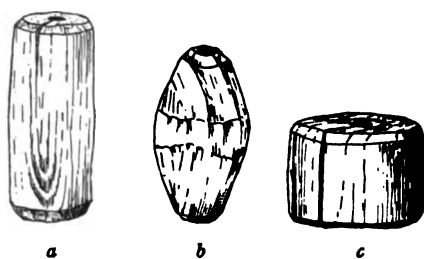


FIG. 11.—Net floats.

later years at least. In the extensive cypress swamp west of Millsboro, at the head of Indian river, game of various kinds was formerly abundant. Bears, deer (until about 25 years ago), raccoons, opossums, rabbits, quail, and squirrels were hunted. Strangely

enough, though probably from climatic causes, the woodchuck and the partridge (*Bonasa umbellus*) are missing from this locality. The only vestiges of native hunting devices are the degenerated bows and

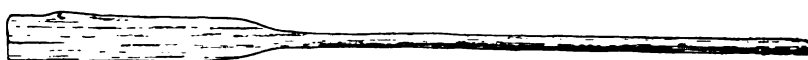


FIG. 12.—Paddle for fishing boat.

arrows, and two or three kinds of snares. The bows and arrows are now only rarely found among the boys, who use them in their play or for chasing rabbits and squirrels. In the memory of some



FIG. 13.—Bows.

of the older men, however, they were regularly carried by children who went hunting in the woods with their fathers, who of course



NANTICOKE TYPES. FAMILY GROUP AND GROUPS OF SCHOOL CHILDREN
(NOTE THE POSITION OF REST ASSUMED BY THE BOY IN THE LOWER LEFT-HAND GROUP)

were armed with guns. The only bows available now are the small ones, $2\frac{1}{2}$ to 3 ft. long, made of white cedar or oak—plain staves sometimes squared in section (fig. 13). The arrows, 17 in. long, are more interesting because they exhibit features that resemble those of the arrows of the Southeastern tribes. Here, for instance, a cone of tin forms the head (fig. 14), for shooting small creatures and even fish.

A common device for trapping rabbits and opossums is a box-trap made of a hollowed gum-log. From a single hollow log, eight or nine sections may be cut off to make as many traps. The back is closed with a piece of board, the front opening is provided with a drop door, as shown in the illustration (fig. 15), and a trigger attachment with dropping apparatus. An ordinary box is often used, but it is interesting to note that in the Nanticoke device there are found some features which differ from those of the common rabbit box-trap of the country boy. Some of these may be traced to local Indian origin.

Several choking or spring snares (fig. 16) are also interesting. The illustrations show all needed details. A slip-noose is attached to a bent sapling or pole. In one variety the trigger-stick, attached by the middle to the string, is caught vertically in the crotch of a stick driven into the ground, where it is held by the bait-stick. In the other, the trigger holds in the notches by the pull of the string, the moving of the bait-stick freeing it from the notch. In both of them the loop is commonly supported upon three or four small forks, so that it rests in front of the bait, just beneath where the animal's head comes.



FIG. 14.—
Arrowhead.

OTHER INDUSTRIES

BASKETRY

The basket-making of the Nanticoke is the survival of an old art, the methods and materials, as well as some of the present-day types, representing the more utilitarian side of the original industry.

The Nanticoke nowadays make only the plain splint baskets for household and farm use, in a variety of sizes but of only one style. These are of the common, circular-bottomed twill (over-one-under-one) weave, and range in capacity from about a quart to approximately a bushel. In the matter of the rims, the baskets show an interesting and significant peculiarity which will be figured later, though in all other respects their baskets would pass without comment in any of the Eastern Atlantic Algonkin tribes.

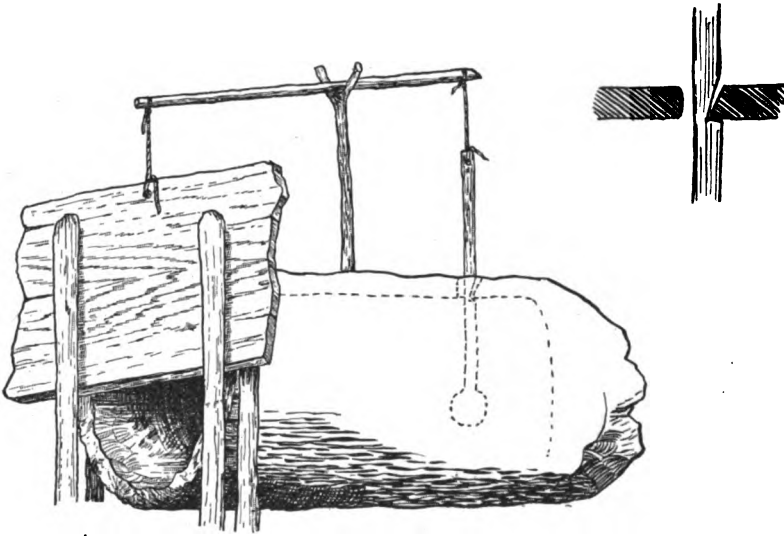
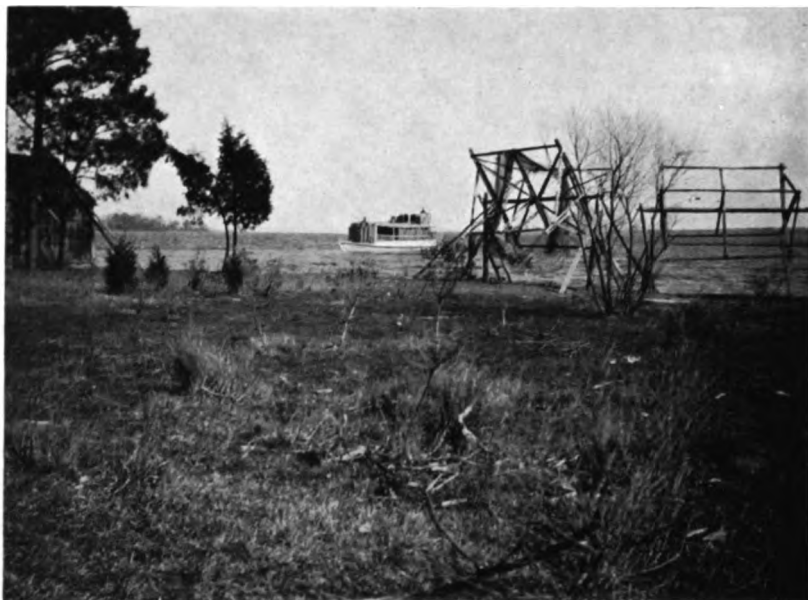


FIG. 15.—Gum-log rabbit trap.

The materials used are yellow pine (*Pinus echinata*) and white oak (*Quercus alba*). The trees are felled, and the splints loosened at one end of the log and pulled off by sheer strength without previous pounding or other preparation. With a knife the splints are next smoothed and thinned to the desired proportions, when all is ready for the weaving.

The bottoms are of two kinds, round and rectangular. In the former, the weaver begins with from twelve to sixteen standards, arranging them like the spokes of a wheel and weaving the splint filling spirally over-one-under-one; this is continued up the sides



SCENES ON INDIAN RIVER, DELAWARE, SHOWING (UPPER) NET-REELS AND (LOWER) SEVERAL
ARCHEOLOGICAL SITES

to the rim. In baskets with rectangular bottoms, the pattern is of the common checkerwork type, the sides being as in the preceding.

In practically all respects there is nothing unusual in the baskets with the exception of the rim, where a local distinction appears. The wall of the basket being finished, every alternate standard is

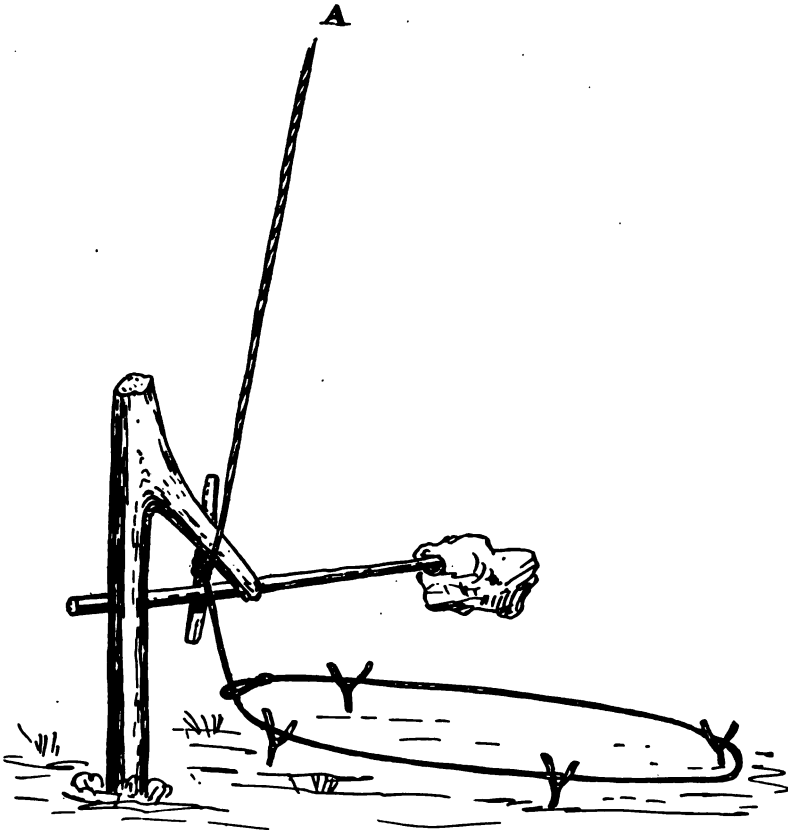


FIG. 16.—Spring snare.

bent down and the other cut off. Inside and outside of this is a smoothed hoop, flattened on the inner face and rounded on the outer. Above and between these hoops is another, rounded, and the three are bound by a splint wrapping that passes continuously round the upper hoop and at every fifth or sixth turn comes down

and encircles the inside and outside hoops. This feature is shown in figure 18. I have not seen anything like it, except in Malay basket rims and in some specimens from the Congo. Practically all the Nanticoke baskets have it.

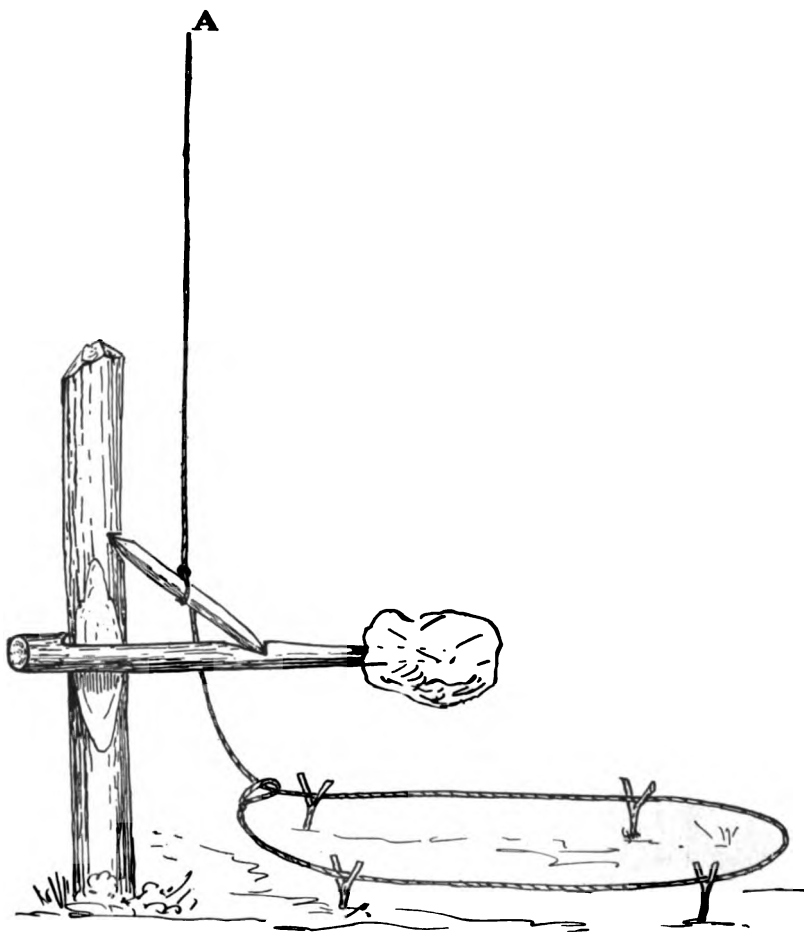


FIG. 17.—Spring snare.

Generally speaking, the baskets are of two sizes. The larger ones (pl. xx) are either for vegetables or for fish, and range from 8 to 16 in. in height and from 12 to 20 in. in width. The smaller specimens (pl. xix) are provided with bales and are used for



SCENES ON INDIAN RIVER, DELAWARE

carrying or storing small articles, eggs, fancy-work, tools, etc. They average 11 to 12 in. high and 7 in. wide. Occasionally some attempt at decoration is made by dyeing one or two woof splints a dark color with pokeberry or other native dye.

Until a few years ago baskets woven of rushes were known.

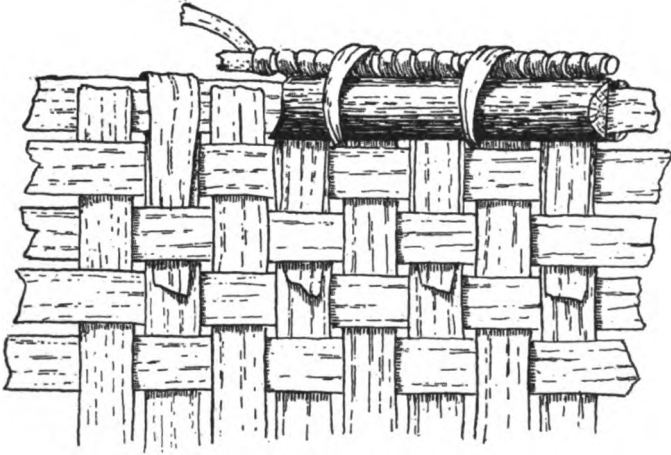


FIG. 18.—Detail of basket rim.

A rather interesting though degenerated fancy basket, obtained from one of the women of this community and said to be of a kind more common in times past, is constructed of corn-husks. Lengths of these have been braided and coiled spirally to form bottom and sides, the attachment sewn being of cotton. Around the sides are sewn loops of corn-husk to give an ornamental effect, a braided husk handle completing the receptacle. It is about 6 in. wide and 3 in. high (pl. XIX).

DYES

The following substances are used for coloring basket materials:

Poplar bark, boiled, gives a dark-brown color.

Crushed chokecherries give a black or blue color.

Pokeberry juice gives a pink color.

Wild indigo plant gives a dark-blue color.

Red-oak bark, boiled, produces a light-brown color.

Walnut hulls are boiled to produce a brownish dye.

Myrtle berries give various shades of purple, red, and dark brown.

MISCELLANEOUS

Gourds are commonly raised among the Nanticoke, the bodies being used for drinking vessels or as receptacles for such things as seeds, salt, household odds-and-ends, work materials, and, in former times, food. Some examples are illustrated in figure 19. By cutting off the necks, different depths and shapes are obtained. Sometimes the rims were scalloped for ornament. Gourds in appearance

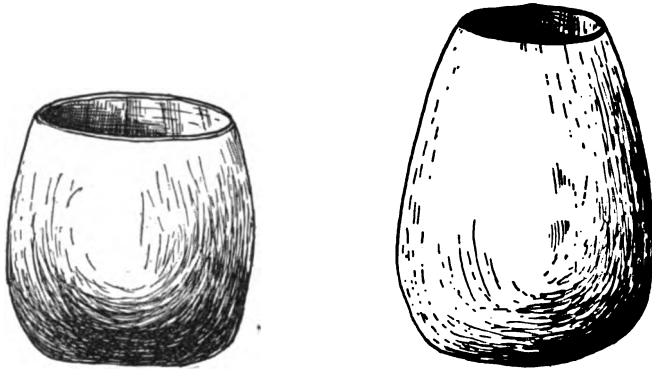


FIG. 19.—Gourd receptacles.

show a close resemblance to pottery, which they are said to have supplemented in use. Small gourds, with an aperture in one side, are commonly hung in trees as nesting places for bluebirds, martins, and wrens. Children use small gourds dried with the seeds inside for rattles.

Dug-out canoes have been obsolete for almost fifty years. Mr Clark says that those he remembers were pointed at both ends, were made of pine, and were about 18 ft. in length. He states, as might be expected, that they were made by alternately adzing and charring the log. The canoe was poled, and paddled with a long paddle said to have been similar to the kind used with boats today (fig. 12). Canoes are called "pirogues."

An interesting method of hanging meat, especially salted pork, is without exception employed by all these people. In the meat-house of every farm are cross-poles supporting hams and other meat. The feature of note, however, is that the meat is always hung by a



NANTICOKE HOMESTEAD, AND CORN MORTARS IN USE

withe of Adam's needle, or yucca, not by rope or cord. The use of these fibers is evidently a survival of an aboriginal practice.

LOCAL CUSTOMS

THE TURKEY SHOOT

The only Indian custom surviving in the community today for which we can find a parallel in the historical accounts of the region, is one known as the Turkey Shoot, or "Shooting Match." In autumn, generally in November, it is customary among the Nanticoke to hold gatherings at different farms where the women sew and gossip and prepare something to eat, while the men, armed with shotguns, repair to a spot in the field near the house. There a piece of stick is inserted in the ground and a line drawn about one hundred paces away. The man at whose home the shoot has been assembled provides discs of paper upon which any of the marksmen may have their initials written by paying a fee of five cents, which entitles him to a shot at the paper. Then a certain chicken or a turkey is indicated as the one to be shot for, those who wish to purchase a shot make payment and receive their slips, and then each takes a shot at his own slip which, at his turn, is fastened to the stick. The man who has made the best shot, as indicated by his slip, wins the bird. Years ago it was the custom to try to shoot the head off the bird. These "shoots" are very much in favor in the community, serving as social gatherings for families living far apart. The ancient Nanticoke sport is thus described by Campanius: "The sachem causes a turkey to be hung up in the air, of which the bowels being taken out and the belly filled with money, he who shoots the bird down gets the money that is within it."¹

WEDDING SERENADE

Among other rural customs in the community the Wedding Serenade is well known. On the night of a marriage a crowd of men and boys gather at the house of the wedding and serenade the bridal pair with singing, and an improvised orchestra of cow-bells,

¹ Francis Vincent, *A History of the State of Delaware*, vol. 1, p. 71 (quoting Campanius, p. 128), Phila., 1870.

horns, and the like. If the groom does not invite them in and treat them to food, they ride him round the house on a fence-rail.

GAMES

Besides the ordinary country games of white children, the Nanticoke play some group games which may have an element or two of individuality. One is "Bear-in-the-ring" (see pl. xx). Within a circle of boys holding hands stands another boy who is the "bear." His object is to break through the ring and escape. Should he succeed, the one to catch him has the privilege of being the "bear" next time. Another game is "Toad-in-the-meadow."

Cat's-cradles are generally well-known among these people. The figure known among the Southern Indians as "crowfoot" is common here also as "crow's feet." Another is Job's Coffin and is regarded as symbolic of the constellation of that name. String-figures in general among the Nanticoke, it is interesting to note, are regarded as representations of star groups.

FOLKLORE

MEDICINE PRACTICES

The following amulets and herb cures were learned of among these people. Knowledge of them seems to be quite generally distributed among both sexes; the idea prevails, however, that there are some people who are more gifted in their ministrations than others. For instance, there are those who have the gift of removing sickness by their will. The seventh son or daughter is thought to possess some such magic power and the knowledge of useful medicines.¹ Then others there are who have the power to cast "spells" on people.

A string or necklace of deerskin will prevent the wearer from getting whooping-cough.

A necklace of kernels from an ear of red corn will protect the wearer from nose-bleed. (See pl. xvii.)

A dried spider wrapped in cloth and put in a thimble worn round the neck will also prevent nose-bleed.

¹A belief almost universal among the Eastern Indians as well as among the whites.



NANTICOKE CORN-CRIBS



FINER BASKETS OF AN EARLIER PERIOD

For curing a lame person, secure a worm, put it in a bottle, and hang the bottle up until the worm decays, then rub the matter upon the lame limbs.

To prevent fevers during summer, it is said, chew the petals of the first hepatica flower which you see in the spring. The hepatica plant (*Hepatica triloba*) is called "chills-and-fever plant."

Horsemint (*Cunila origanoides*) is brewed for colds.

Calamus root, "muskrat root"¹ (*Acorus calamus*) is used for colic and for babies with colds. A tea is usually made. Or a piece of root may be carried about to be chewed. Mothers chew it and blow into infants' mouths to stop pain or to sooth them to sleep.

Mullein (*Verbascum thapsus*) leaves make an excellent poultice for fevers. Roll them out, dip them in vinegar, wring them out and bind them to the back of the neck, forehead, wrists, and soles of the feet. Keep wet with vinegar.

Wild indigo plant (*Baptisia tinctoria*) and poplar (*Populus deltoides*) brewed together make a good lotion for sprains.

Pellets of pine tar (*Pinus echinata*) make a fine cathartic and are good for lame back.

An eel-skin is worn around parts affected with rheumatism.

Certain persons having the power can charm away warts by their spittle.

Chills likewise can be "promised"² away by a healer or witch.

Cuts are healed by covering them with cobwebs. In such a case a silver dollar is also bound over the cut. Soot likewise is used to heal cuts.

Blow tobacco smoke in the sufferer's ear to relieve earache.³

For a pain in the stomach, blow tobacco smoke in a cup of water and drink it.

Tobacco smoke blown in the baby's mouth will relieve its pain.

Prickly-pear (*Opuntia opuntia*) rubbed on warts will remove them. Inflammation may also be drawn from stings or bites by applying a split prickly-pear joint.

¹ Incidentally similar to the Wabanaki name.

² Made to leave by promising the subject that they will go.

³ Also a Malecite remedy, and known to the Mohegan.

For chicken-pox, place the afflicted child in front of a chicken-house door and let the chickens fly out over him.

For sore throat, place the bent thumb in the patient's mouth and press his jaws as far apart as possible for five minutes.

For nose-bleed, place a cobweb up the nostril. Also drop a bunch of brass keys down the back.

A tea brewed of skunk cabbage leaves (*Spathyema foetida*) will cure a cold.

To cure chills, take a stick and cut as many notches in it as you have had chills. Then go to the stream that flows to the east throughout its course, throw the stick into the water over the left shoulder, and walk away. The chills will leave in a day or two.

To cure warts: Pick up a stone at a cross-roads and rub on the wart as you walk along. Throw it over your left shoulder and walk straight to your destination without once looking back. The wart will disappear in three or four days.

To cure backache: Wear the skin of a blacksnake round the waist. The snake-skin must be removed whole from the living snake. (One old man is said to have obtained a fresh skin every spring and to have worn one of these constantly.)

A woman who marries but does not change her name (marries a man of the same name) can steal bread from her neighbors and give it to children to cure whooping-cough. She may even ask a friend to leave some bread where she can take it without being seen. A variant of this says that it is the bread stolen from a woman who does not change her name that will effect the cure.

For whooping-cough, take as many roaches as there are children afflicted and name each after one of them. Then each child puts the roach named after him into a bottle and corks it tightly. When the roach dies the disease will leave the child. But be sure that the patient's bowels are kept open or the charm may react and kill him.

The following verse of Scripture will cure nose-bleed; but it can be told to or said over only a person of the opposite sex. (Ezekiel, 16:6.) "When I passed by thee I saw thee polluted in thy blood and I said unto thee Live! and thou didst live in thy blood: yea thou didst live in thine own blood."



LARGE FLAT BASKET



NANTICOKE CORN MORTAR AND "SHELLING MORTAR" IN USE

Cure for croup: Stand the child against the door-jamb and mark its height. When the child outgrows the mark it will be cured.

Cure for frost bite: Bind an animal's bladder on the affected part.

Several plants have local folk names, although no particular efficacy is ascribed to them. Milkweed (*Asclepias tuberosa*) is called "frog's milk." Wild gooseberries (*Grossularia* sp.) are called "Devil's berry" because when they ripen one at a time and fall off during the night, they say that the Devil picks them off.

Sassafras (*Sassafras sassafras*), pronounced locally as "sarsa-fack," is made into a tea and drunk in spring to ward off fever and ague, and to cool the blood. It is thought that fever and ague are brought on by going barefoot or swimming in the river too early in the spring. The ailment is very common in this region.

The leaves of a plant called "fish weed" are chewed for worm troubles. Snake-root (*Aristolochia serpentaria*) is steeped and given for the same ailment.¹

Pipsissewa (*Chimaphila maculata*) is steeped and drunk by the cupful to cure ague.

The leaves and stems of a plant called "King Cole oil weed" are good for poultices.

Balsam plant (*Impatiens biflora*) is steeped and made into a poultice for burns.

Burdock (*Arctium minus*). Leaves steeped and applied to boils.

Arrowroot (*Pellandra virginica*) is grated and fed to babies. It resembles corn-starch when mixed with milk.

Pennyroyal (*Hedeoma pulegioides*) and Tansy (*Tanacetum vulgare*) are both used as sudorifics. Pennyroyal is also considered an excellent kidney and liver medicine.

Myrtle (*Leiophyllum buxifolium*) berries are made into wine and tonic.

Wild Thyme (*Thymus serpyllum*) and Boneset (*Eupatorium perfoliatum*) steeped together are drunk for chills and fever.

For convenience of reference the Nanticoke-Moor remedial plants are presented in the following form, local names being marked with an asterisk.

¹ Snakeroot is also a Penobscot and Mohegan remedy.

Hepatica (<i>Hepatica triloba</i>)	Fever and chills
Horsemint (<i>Cunila origanoides</i>)	Colds
Calamus (<i>Acorus calamus</i>)	Colic
Mullein (<i>Verbascum thapsus</i>)	Poultices
Wild Indigo (<i>Baptisia tinctoria</i>)	} Sprains
Poplar (<i>Populus deltoidea</i>)	
Pine (tar) (<i>Pinus echinata</i>)	Cathartic
Prickly-pear (<i>Opuntia opuntia</i>)	Cure warts, frost bite
Skunk Cabbage (<i>Spathyema foetida</i>)	Colds
Sassafras (<i>Sassafras sassafras</i>)	Fever and ague
Milk-weed (<i>Asclepias tuberosa</i>)	— "Frog's milk"
Wild Gooseberry (<i>Grossularia</i> sp.)	— "Devil's berry"
*Fish Weed (sp. ?)	Cure worms
Pipsissewa (<i>Chimaphila maculata</i>)	Ague
*King Cole Oil Weed (?)	Poultices
Balsam Plant (<i>Impatiens biflora</i>)	Poultice for burns
Snakeroot (<i>Aristolochia serpentaria</i>)	Cure worms
Burdock (<i>Arctium minus</i>)	Boils.
Arrowroot (<i>Peltandra virginica</i>)	Baby food
Pennyroyal (<i>Hedeoma pulegioides</i>)	{ Kidney, liver sudorific
Tansy (<i>Tanacetum vulgare</i>)	
Myrtle (<i>Leiophyllum buxifolium</i>)	} Tonic wine
Thyme (<i>Thymus serpyllum</i>)	
Boneset (<i>Eupatorium perfoliatum</i>)	Fever and chills

WEATHER SIGNS

Killdeer plovers ("kildee") flocking and calling in the morning when it is calm are a sign of coming wind.

Killdeer plovers as well as some other birds are thought to speak certain words. The killdeer says, "Wind blow, wind blow!" This is another sure sign of the coming of wind.

The flight of wild geese is also regarded as a sign of wind approaching.

If the chickens stay out in the rain and continue feeding you may expect it to rain for a long time. They know that it is going



FISH HAWK'S NEST, PROTECTED BY TABOO



NANTICOKE BOY WEARING NECKLACE OF RED-CORN
KERNELS AS A CHARM AGAINST NOSEBLEED

to rain and want to get something to eat before they go to shelter. If they run for shelter when it begins to rain, the rain will not last very long. They know they can feed later on, so do not stay out in it.

When you hear the surf (the ocean is nine or ten miles to the eastward) you may expect rain the following day. (This denotes an east wind.)

When crows or blackbirds flock in a field it is going to rain.

When hogs become restless, grunt, and pick up sticks, cobs, etc., as though they are going to make a nest or a bed, a storm is coming.

When it rains and the sun is shining it will rain again the next day.

Where the ends of the Milky Way appear to rest on the horizon is the direction from which the wind will blow the next day.¹

The sun-dog is a sure sign of a coming storm.

If you kill a snake and throw it into a tree, it is a sign that it will rain the next day if the carcass hangs in the branches, but if it falls through the branches the next day will be clear.

MISCELLANEOUS SIGNS, OMENS, AND BELIEFS

If you mock a mourning dove, some time he will burn you.²

The cooing of the turtle-dove indicates the direction where your lover is.³

The whippoorwill's first cry in spring is the sign that it is time to plant corn.

A black animal seen crossing one's path at the beginning of any venture is a sign of bad luck. Turn back and choose another time.⁴

A falling star is the sign of disappointment.

When the new moon is first seen, take out your pocketbook and shake it toward the moon for good luck.

¹ Known among the Indians as far as the Montagnais of Labrador.

² Resembles the Wabanaki belief about mocking the screech owl.

³ Known among the Muskogians and Yuchi.

⁴ Resembles an Ojibway and Wabanaki belief.

The Jack-o'-my-lantern is thought to be a kind of spirit which is likely to follow people and cause misfortune. To prevent this, people turn their pockets inside out when they see one. An informant claims to have seen a number issuing one night from the stump of a dead tree.

Ringin in the ears is known as "death bells" and announces the death of some friend or relative.

On New Year's day it is the custom for men to go visiting, the first to come to the house receiving fifty cents. But for a woman to come to a house on this day is an ill omen.

Like storks in Europe, fish-hawks (*Pandion haleætus carolinensis*) are venerated by the Nanticoke. It is a sin to kill them or to disturb their nests. The fish-hawks respond by building their nests near habitations, generally in open fields among the limbs of a dead tree, sometimes as low as fifteen feet from the ground, and returning to them year after year. These huge nests are fairly common and become the abode of many small birds as well. (See pl. xvii.)

Buzzards also are never molested.

If a scorpion lizard (locally "scorpion," *Sceloporus undulatus*) gets on a person and manages to run completely round the body, the person will die.

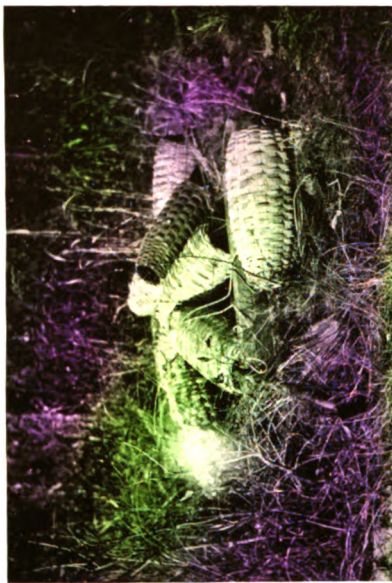
To win the girl with whom you are in love: Cork an empty bottle and take it to a stream that flows to the east through its entire course. Tie a string round the neck of the bottle and fasten the other end to a limb or a bush overhanging the stream. Then put the bottle on the water so that the stream pulls it along until the string becomes taut. Draw with a stick in the sand a picture of the girl. Anything will do provided it be your best and your mind is intent upon it so that you really mean it to represent her the best you can. Then go away and leave it. As the string holds the bottle so she will cling to you. But if the string breaks, then she will break away from you.

To win the one with whom you are in love: Go to a well at noon on the first of May and hold a mirror so as to get the reflection of the water below. In the mirror you will see the image of the girl

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NANTICOKE FISHING SCENES ON INDIAN RIVER
(HAULING HERRING NET, FYKE SET IN ICE, AND EEL-POTS ON SHORE OF RIVER)

or the boy you are going to marry. If you are not to marry at all you will see a coffin.

Two of the same sex are required in performing the following love charm: Boil an egg hard and let it stay in the water a day. Then each breaks it, takes out the yolk, and fills with salt the space left by its removal. Eat the white of the egg and the salt without water and without saying a word. Walk out of the room backward, go upstairs backward, and get in bed backward. In a dream the girl or the boy you are to marry will come and bring you a drink of water. During all this time and until morning of the following day not a word must be spoken.

The Midnight Supper: Only two persons of the same sex can perform this charm. At midnight, with the lights turned very dim, two people of the same sex sit at the opposite ends of a table and eat ash-cake [see page 14]. If you are going to marry, the form of the person you will wed will appear to come to the door and walk straight across the room. If you are not to be married, a coffin will come and rest alongside of you.

To cause a person's death: Get a piece of his hair and bore a hole into a pine tree when the sap is down; that is, before March 20. (Any time between September 20 and March 20 will do. The sap begins to run up about March 20.) Put the hair in the hole and plug it up. The sap will come up and the person whose hair has been placed there will die within a year.

If a hen crows it is a sign of bad luck and it should be killed.

A rooster crowing at the door denotes a visitor.

When a turtle dove is heard mourning, sit down and take off your shoe, and you will find a hair in it the color of your future wife's hair.

The small eggs often laid by hens are called "latter eggs." They denote that the hen is through laying for the season.

To hand a person a closed knife will bring bad luck. The knife should be opened.

When a child's umbilical cord is severed, it should be disposed of by burning, lest it bring bad luck.¹

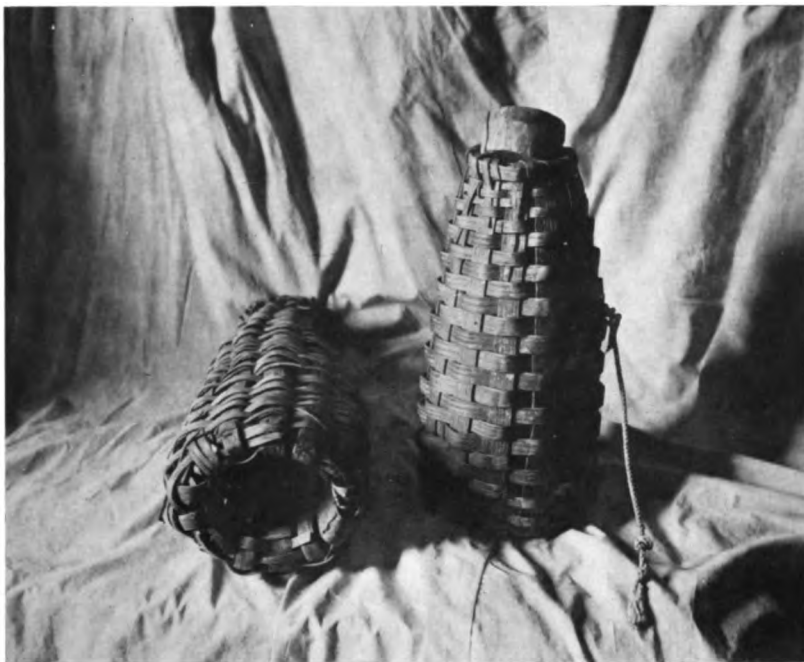
¹ Incidentally similar to Penobscot.

Reptile Lore.—The red-headed skink (*Eumeces*) is called “woods bitch” and is thought to be poisonous. The male fence lizard (*Sceloporus undulatus*) is called “scorpion” and is thought to be poisonous because it has a blue throat, while the female, which has no blue on the throat, is called “lizard” and is not considered poisonous. Children capture these lizards by means of a noose of long, tough grass, called “lizard grass,” and play with them as though they were little horses. They say that the lizard is not afraid of “lizard grass” and will permit himself to be noosed with it. Salamanders are all considered to be full of venom and are thought frequently to cause the death of hogs who have eaten them in the woods. Cats are also said to eat lizards in the spring and to become very thin as a result; they are then given a quantity of fat to eat, which causes them to get relief from the poison. The water snake (*Tropidonotus*), the hog-nosed snake (*Heterodon*), known locally as the “bastard hornet snake” (*bastard*, “not real”; *hornet*, “horned”: “false horned snake,” in the local dialect), the “field wiper” (field viper), a general name for field snakes, are all erroneously considered venomous. The black racer (*Bascanion*) is the only snake known correctly to be harmless.

Local snake-lore asserts that the “field wiper” bites itself and dies of its own poison; that the copperhead emits a smell like cucumbers; that a blacksnake-skin worn round the waist will cure rheumatism; that there exists a hoop snake which can take its tail in its mouth and roll like a hoop; that the blacksnake can suck a cow’s udder; that if a dead blacksnake is hung upon a tree it will rain soon, perhaps “before you get home”; that the first thunder in spring awakens the snakes from their winter sleep, and that when a snake is killed its mate comes to seek the remains.

ARCHEOLOGY AND LOCAL TRADITION

In Indian River Hundred, which lies on the northern shore of Indian river, the Nanticoke point out a number of archeological sites of which they have knowledge from their old people. From Millsboro eastward, following the shore, are almost continuous vestiges of camp-sites which lie up on the sandy banks of the river. At



NANTICOKE EEL-POTS

(THE SPECIMEN AT THE LEFT IS MADE OF WHITE OAK, THE OTHER OF PINE)



NANTICOKE HAND BASKETS AND CORNHUSK BASKET

Millsboro are pointed out the remains of pits in the sandy hillside just above the ponds at the edge of the village. These pits are said to have been "wigwam pits." Without discussing this claim, one finds the village-sites nearer to the Indian settlement about six miles from Millsboro, close to a spot known locally as "Puddle Hole," much more interesting. Here quantities of arrowheads, hammerstones, lanceheads, knives, steatite objects, and quantities of a fine, stamped, pottery-ware are found upon the sandy surface of the soil. From this spot, beginning a few hundred yards and extending a mile or so eastward are remains of several shell-heaps, the shells widely scattered over the surface, though not extending to any depth. These shell deposits, always near the bank, are of the shallowest sort, the soil being visible among the shells even where the latter are most abundant. Occasional artifacts are found in the midst of these spaces. The Indians say that the ancient people came to these places to have their oyster feasts. The bank has been washed away very much by the action of the river. In the memory of Mr Clark, one point in particular, where his grandmother's house stood, has been washed back more than fifty feet. Probably the camp-sites along the shore have suffered much from this cause.

Another more interesting site is a low mound situated about a mile and a half from the river, immediately bordering the road which leads to Georgetown, Delaware, fourteen miles away. This mound I estimated to be about 15 feet high and 40 paces in diameter. It is composed entirely of sand and is fairly discernible, though Mr Clark says that in his lifetime and that of his father it has worn down at least five feet. The mound now has upon it a growth of sturdy yellow pines. Mr Clark says that his father learned from the elders of the community, many years ago, that the mound was a repository for the dead in the days of the Indians. We might presume that this mound was the site of one of the mortuary houses of the Nanticoke. In excavating a pit near the center of the mound with Mr Clark, we came upon fragments of very old red brick and green-glass bottles which are said to have been sold with rum to the Indians by the early traders.

TALES

For a rather large community there seems to be a dearth of tales having any local distinctiveness or dealing with the animal kingdom. The few rather colorless stories which repeated inquiry brought out are the following, some of which are widespread among both whites and negroes.

RABBIT AND FOX RAISE A CROP

One time a Rabbit and a Fox made arrangements to become partners in raising a crop. They got a piece of ground and set out to raise turnips. The Fox said he would take all that was above the ground for his share of the crop, and the Rabbit could have what was underneath the ground for his. So that year the Fox got only the turnip-tops, while the Rabbit got the turnips. Next year they entered into partnership again, and the Fox said that this time he would again have first choice. So he chose what grew beneath the ground for his share, and the Rabbit agreed to take what grew above. Then they planted their crop, and this time it was cabbage. When the crop was gathered, the Rabbit got all the best again and the Fox got nothing again. This is how he got fooled.

ORIGIN OF DEAD WOOD

One time Crane went down to the river to catch eels. When he got one, he swallowed it alive, but it came right through him and came out his other end. He caught the eel again, and he did the same, with the same result. And again. Then he backed up against a dead stump and swallowed him again, saying, "Now you devil, I've got the dead-wood on you." And the eel could not get through. That is the way, they say, dead wood first started.

THE WREN OUTWITS THE EAGLE

The Eagle was recognized as king of the birds, because he could fly higher than any others. But one time the little Wren said that he could go even higher than the Eagle. So they challenged him to prove it, and they began flying upward. Then the Wren perched himself upon the Eagle's back and stayed there until the Eagle



NANTICOKE CHILDREN PLAYING "BEAR-IN-RING"



NANTICOKE FISH AND CORN BASKETS

had flown as high as he was able. When they came down again the Wren declared that he had been higher than the Eagle, for as high as the eagle had gone, he had all the time been above him.

THE WONDERFUL HUNTER

There was once an old man and his wife who lived alone in the woods. One time they were all out of provisions, and he had only one bullet and one charge of powder for his gun. So he went hunting to see what luck he would have. Pretty soon, as he was going along, he saw a deer on his right. At his left, all in line upon the branch of a tree, he saw seven wild turkeys. At the same time he espied a rabbit directly in front of him, and a covey of quail behind him. So he took aim and shot his one bullet into the branch upon which the turkeys were sitting, splitting it, so that when it sprang together the seven turkeys were caught by the toes. At the same time the gun exploded, the barrel went backward, striking and killing the deer, the stock flew forward killing the rabbit, while the burst of the thing blew his coat off his back over the flock of quail. Now he had so much game that he didn't know what to do, so he hurried home to get something to carry it in. On the way home he jumped through the branch (stream) and caught his breeches full of perch. That is a hunter's story.

A TERRAPIN FOR A WATCH¹

There was once an old fellow who met another going along the road. In those times they told the time of day by the sun. The old man asked the other about the time, and the other pulled a watch out of his pocket and told him, "Half past ten." The old man had never seen a watch before and thought it was a wonder. Pretty soon, as he went along, he found a terrapin. He thought it looked like the other's watch, so took it along with him, putting it in his shirt. After going a little way he met a woman, who asked him about the time. "Half past twelve and scratching like Hell!" he cried as he jerked the terrapin from his shirt.

¹ A version of the same tale is current among the Creek Indians, among whom I obtained it in text in Oklahoma.

THE THREE QUESTIONS

There were once two Irish "terriers" who were brothers. One of them was offered a job by a wealthy man who promised him his pay if he would answer three questions that he would put to him. The Irishman accepted and agreed to come next day to hear the questions. When he went home and told his brother about it, his brother desired to go in his place. The next day, accordingly, the brother went in the other's place, and the man asked him, "How much does the moon weigh?" "One hundred pounds," answered the Irishman. "How do you know?" asked the man. "Because it has four quarters," was the answer. "Very well then, how many stars are there?" "A million. If you do not believe it, count them!" For the third question the man asked, "What am I thinking of?" "You think I am Pat, but I'm not, I'm Mike," was the reply. Having answered the three questions, Mike secured the job for Pat.

THE LOCAL DIALECT OF ENGLISH

Since, at the instance of Dr Boas, studies of folk-communities in various parts of America are beginning to be considered of importance to ethnology, I shall append a list of vernacular terms in use among these people. There are, of course, many more idiomatic forms of speech than I could record. The dialect in general has so many local peculiarities that people from other parts of the Middle States often find it difficult at first to comprehend. The white people of Sussex county, moreover, do not have the same idiosyncrasies, as I have taken pains to observe, although those born in the immediate neighborhood of the Nanticoke-Moors do.

Phonetic Peculiarities¹

Among the consonants *r* is pronounced with the tongue tip well curved but with no trill. Final consonants have a tendency to be dropped, as *mort*, "mortar," *orga*, "organ."

English ordinary *i* (*ai*) and *a* before *r* are given the quality of

¹ The characters recommended for American ethnologists by the Committee on Phonetics of the American Anthropological Association are used here.



NANTICOKE COFFEE MORTARS



NANTICOKE CORN MORTARS

ɔ', a close vowel almost like *a* in *fall*; for example *are* is ɔ'r, *sparrow* is spɔ'r, *fire* is fɔ'r. The impure vowel *ea(r)*, as in *heard*, *perch*, and *peart*, is pronounced i'r (i', long, as *ee* in English *queen*), whence, *pi'rtc* "perch," *pi'rt* "peart," *hi'rd* "heard." Final *a(h)* is often pronounced as *e*; *Noah* as "noe." Also *-ere* ("there, where") is pronounced *-ar* ("whar," etc.).

In vocabulary we observe the following local usages:

NOUNS AND PRONOUNS

mullet	mullein plant
mirkel	myrtle tree
sarsafāk	sassafras
yu'pɔ'n	wintergreen berry. (The <i>yupon</i> in the South is the name of <i>Ilex cassine</i> .)
tit spɔ'r	"tit sparrow," any small sparrow—English, chipping or song sparrow.
branch	a stream
puddle hole	a pond
savannah	a swamp in the woods
pound	the farmyard enclosure
ganzer	a woolen sweater
snouterbilly	cap that pulls down over the ears.
darts	arrowheads
pirogue	a dugout canoe
booby owl	barred owl
saddy	thank you
hit	it
foreparents	forefathers
meetin'	church
shets	pine needles (probably for "sheds")
nigh	this one, here
yon	that one, there
hundred	a settlement
fat lighter }	resinous pine splints for starting a fire.
fat wood }	

VERBS AND OTHER PARTS OF SPEECH

to gear up (gɑ'r)	to tie, harness, lace
to chunk	to throw something, generally a piece of wood, at someone.
to work on	to tease, torment, to insist on
to over	to get over, recover
out of	descended from, belonging to
to get together	to prepare, to make
tarry	to linger
stir	to hurry
kivver	to cover
peart (pi'rt)	to be in good health, lively
pleasurin'	to be enjoying oneself, to seek pleasure.
boat ridin'	to sail in a boat
to handle	to manage
studyin'	worrying
right	very (<i>right cold</i> , "very cold")
tolerable (tolebal)	quite
make a light	to light
to reckon	to guess
just like as if	just as though
mashed	bruised
to be fifteen out	more than fifteen years of age
proggin (prɔ'g'in)	to make a living on the river by fishing and canoeing
fusty	fussy, fretful
gettin' them worked on	having work done on something
slop the hogs	feed slops to the hogs
rest your hat	take off your hat (said to a caller)
deviling'	to tease
beatenest	worst
to see after	to look after, provide for
figgerin'	planning

Several interesting phrases characterize the community:

"Are you well?" (with a rising accent) is the common greeting between acquaintances. The phrase "*on* you," "*on* me," "*on*

Isaac" in one sense denote "on your land," "on my land," "on Isaac's land," respectively.

Also "'mongst you" (amongst you) is used almost every time simply "*you*" as the subject of a verb is intended, as "'Mongst you all done?" "Are you all done?" "'Mongs' you comin'?" "Are you all coming?" "'Mongs' you got a dog (dɔ'g)?" "Have you a dog?"

APPENDIX

In a letter to the writer, Dr Amandus Johnson, of the University of Pennsylvania, who has investigated extensively the history of the Swedes in Delaware, says: "A statement in *Beskrifning om de svenska församlingars forna och närvarande tillstånd*, by Acrelius [p. 308], may possibly add to the probability of the 'Moor tradition.' Acrelius says that in 1745 'Spanish privateers tried to make a landing in the Delaware.'¹ It is quite likely that one of these vessels may have been wrecked on the Delaware coast at the time. I have seen a statement to this effect somewhere, but am unable to recall the source." Dr Johnson adds that the settlers at Fort Christiania (Wilmington) strengthened their fort at this time in anticipation of attack.

¹ On the beach at Lewestown, the old name for Lewes, Delaware, iron utensils of the colonial period are often found. These, the natives believe, are relics of the traditional shipwrecked crew. It is asserted that nearly all were saved at the time, and that they dwelt on the beach for awhile.

NOTES ON THE ARCHEOLOGY OF MARGARITA ISLAND, VENEZUELA

BY

THEODOOR DE BOOY

INTRODUCTION

IT was the privilege of the writer to spend the months of February, March, and April, 1915, on the island of Margarita, off the northern coast of Venezuela, in the interest of the Museum of the American Indian (Heye Foundation), with the object of studying the cultural remains of its former aboriginal inhabitants.

After leaving New York, the writer's first stay was in Caracas, the capital of Venezuela, where he presented letters of introduction from Dr Santos A. Dominici, Minister of Venezuela to the United States, to various Government officials, who in turn provided him with credentials directing the civil and military authorities to further the interests of the expedition. In addition to these courtesies, the writer's equipment was permitted to enter free of duty. It is with great pleasure, therefore, that he embraces this opportunity to express his sincere gratitude to the Venezuelan Government, and particularly to General Ignacio Andrade, Minister of the Exterior; Dr Pedro Manuel Arcaya, Minister of the Interior; Mr C. F. Witzke, Director of the National Museums of Venezuela, and Dr Guevara Rojas, Minister of Public Instruction. In addition sincere thanks are extended to Dr Santos A. Dominici, Venezuelan Minister at Washington, and to Mr F. J. Yánes of the Pan American Union, for their courteous and influential letters of introduction.

The writer also received great aid and was shown many courtesies by the Government officials of the island of Margarita. General Juan Alberto Ramirez, State President of Nueva Esparta, the state in which Margarita lies, especially facilitated the investigations in every possible way. Grateful thanks are due also to

Mr Charles Freeman, of Porlamar, manager of the local magnesite mines, to Dr Benigno Campos, physician of Porlamar, and to General José Maria Bermudez.

SITUATION OF THE ISLAND

Margarita is situated between latitude $10^{\circ} 52'$ and $11^{\circ} 11' N.$, and longitude $63^{\circ} 47'$ and $64^{\circ} 24' W.$ The maximum width of the island is about 37 miles, and the greatest distance from north to south about 19 miles. The nearest points of approach between Margarita and Araya peninsula of the mainland, namely, Point Mangles and Point Morro de la Peña, are $12\frac{1}{2}$ miles apart. From the latter point on the mainland to the western point of Coche, the island lying in the passage between the mainland and Margarita, is a distance of eight miles, and from the western point of Coche to Point Mangles on Margarita is a distance of only six miles. It is therefore obvious that communication between Margarita and the mainland by means of canoes in pre-Columbian times was an easy matter, especially as the seas here are invariably tranquil. The accompanying map (fig. 1) is copied from chart 2035 of the United States Hydrographic Office, with the addition of the names of such pueblos and other localities as are referred to in this paper.

There is now little communication between Margarita island and the coastal towns of Venezuela, consequently the writer was obliged to travel from La Guayra (the principal port of the Republic and the port of entry for Caracas) to Cumana on a steamer of the Royal Dutch West India Line in order to connect with the Venezuelan coastal steamer for Margarita at the latter town. The port of Cumana is called Puerto Sucre. Between this port and Cumana lies a small fishing village of the Guaiqueria Indians, who at the time of the Spanish conquest inhabited the peninsula of Araya and the island of Margarita.

THE GUAQUERIA INHABITANTS

Speaking of the Guaiqueria, Humboldt says:

"The name of this tribe of Indians was quite unknown before the conquest. The natives who bear this name formerly belonged to the

nation of the Guaraounoes, of which we find no remains but in the swampy lands of the Oroonoko. Old men have assured me, that the language of their ancestors was a dialect of the Guaraouno; but that for a century past no native of that tribe at Cumana, or in the island of Margarett, has spoken any other language than the Castilian.

“ The denomination of Guayquerias, like those of Peru and Peruvian,

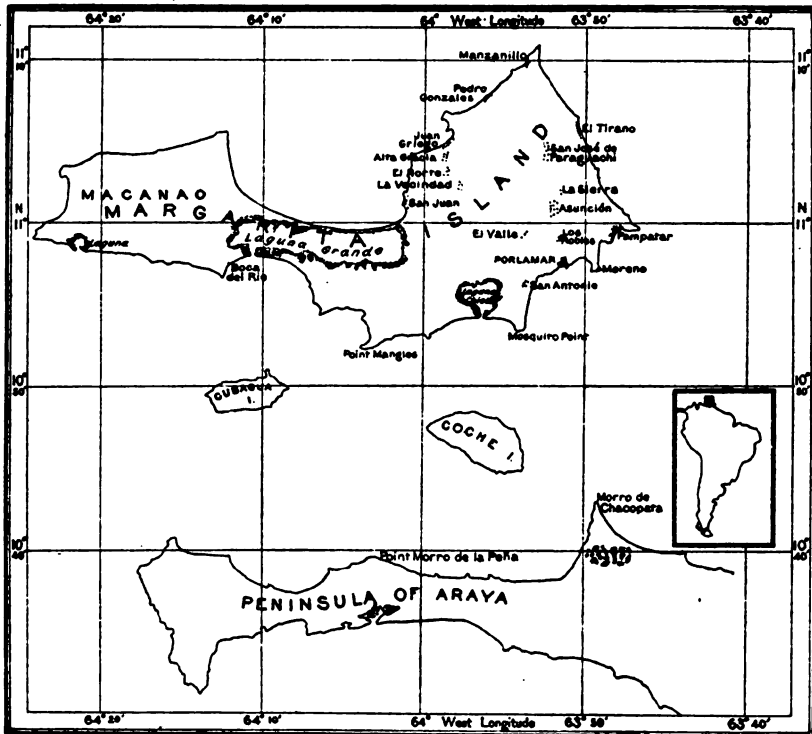


FIG. 1.—Map of Margarita Island and the adjacent mainland.

owes its origin to a mere mistake. The companions of Christopher Columbus, coasting along the island of Margarettia where still on the northern coasts resides the noblest portion of the Guayqueria nation, met a few natives, who were harpooning fish by throwing a pole tied to a cord, and terminated by an extremely sharp point. They asked them in the Hayti language their name; and the Indians, thinking that the question of the strangers related to their harpoons, formed of the hard and heavy

wood of the *macana* palm tree, answered *guaike, guaike*, which signifies *pointed pole*."¹

This was written by Humboldt during his sojourn in Cumana in 1802, and it is interesting to note that the Guaikeria tribe today lives in the same localities it inhabited then and that it has neither spread nor diminished. Codazzi, in 1841, also states that the language of the Guaikeria has been totally forgotten, but that it originally was a dialect of the Guaraunos.²

HISTORY

The early history of the island of Margarita is closely allied to that of the neighboring island of Cubagua (see map, fig. 1). When Columbus coasted the peninsula of Paria on his third voyage, he passed the islands of Margarita, Cubagua, and Coche on July 31, 1498, and, strangely enough, named the first of these islands Margarita (the word *margarita* in Latin and Spanish signifies "pearl"), although he knew nothing of the pearls that were found in the surrounding waters.³ True, he met an Indian on the following day who was in possession of pearls that excited the rapacity of the soldiers accompanying the Admiral, but this would not indicate that he was acquainted with the presence of pearl-beds when he named the island.

The first settlement of Cubagua took place about 1500, when some fifty adventurers sailed from Hispaniola to exploit the pearl fisheries.⁴ These adventurers were obliged to go to the mainland to acquire Indians for work on the pearling grounds, and by their wanton cruelty undid much of the good work that was being conducted by the Franciscan friars settled at Cumana. There can be no doubt that the pearl fisheries must have been highly productive in those times, as the Spaniards in some instances paid as much as 150 ducats each for the Lucayan Indians who were captured in the

¹ Alexander von Humboldt, *Personal Narrative*, 3d ed., London, 1822, vol. II, pp. 191-192.

² Agustin Codazzi, *Resumen de la Geografia de Venezuela*, Paris, 1841, p. 249.

³ Gonzalo de Oviedo, *Historia General y Natural de las Indias*, Madrid, 1851, lib. XIX, cap. 1.

⁴ Leonard V. Dalton, *Venezuela*, New York, 1912, pp. 65, 67 et seq.

Bahamas and transported to Cubagua on account of their skill as divers.¹ In fact, the fisheries were the cause of the total annihilation of the aborigines of the Bahamas. The Cubaguan settlers found, however, that the tribes inhabiting Margarita were too warlike and too well versed in the use of offensive weapons to submit to capture,² consequently the Margarita Indians were left alone. As a result, La Asunción on Margarita was not founded until 1524, whereas Nueva Cadiz on Cubagua had been raised to the dignity of self-government in 1521 and was an important town long before that time. It may serve as an illustration of the strength of the Margarita tribes to state that the early settlers lived on Cubagua, a flat, barren island, with no trees whatsoever, where no water was found, and whence the inhabitants had to send to Cumana for all food supplies and drinking water, when they would have been in as close proximity to the pearling grounds had they lived on Margarita where living conditions, while not good, were infinitely superior to those prevailing on Cubagua. Again we read³ that when Marcelo de Villalobos went to Margarita to colonize and to exploit the resources of the island, he proposed to the King of Spain the building of a fort for defence against the Indians who were "Carib and warlike." The writer's archeological researches, as will be shown, do not indicate that the remains found on Margarita resemble those of the Carib from the Lesser Antilles, and it may well be that Herrera used the name Carib merely to classify the Margarita tribes as different from the other peaceful Indians met by the conquerors in the West Indies. However, in the excavations on the island there was found a quantity of human bones that had been split in order to abstract the marrow, but whether these bones were of the Guaiqueria victims of Carib raids or were the remains of cannibal feasts of the Guaiqueria themselves, could not be determined. But it is more than likely that these split bones are evidences of a Carib raid and had been left by the invaders on the sites of the destroyed Guaiqueria villages, for we find that the native inhabitants at a later time pleaded with Alonso de Ojeda for aid against the Carib

¹ Antonio de Herrera, *Historia General*, Madrid, 1730, dec. I, book VII, chap. IX.

² Dalton, *op. cit.*, pp. 69-70.

³ Herrera, *op. cit.*, dec. III, book VII, chap. II.

of the Lesser Antilles, saying that they suffered greatly from their depredations. Ojeda in consequence went to Dominica and Guadeloupe on a punitive expedition against the inhabitants.¹ Later in his work Herrera contradicts his statement that the Guaikeria Indians were Carib when he quotes Rodrigo de Figueroa, "all Indians of these islands were Caribs excepting those of the Lucayos, Trinidad, Barbados, Gigantes, and Margarita."²

Nevertheless, even if the Guaikeria were afraid of their Carib neighbors to the eastward, the Spaniards who settled on Margarita did not find it an easy task to subjugate the aborigines of the island. Benzoni wrote in 1541 that he arrived on Cubagua and there met Pedro de Herrera, governor of the island of Margarita, who was on his way to Terra Firma, with two brigs and thirty Spaniards, there to get some slaves.³ Had Herrera found it easy to use the native inhabitants of his own colony, conscientious scruples would not have deterred him from enslaving them. And it is probably due to the warlike tendencies of the Guaikeria that they did not suffer the same fate as the other native tribes of the Antilles; moreover, "they enjoy several privileges, because from the earliest times of the conquest they remained faithful friends to the Castilians. The King of Spain names them in his public acts, 'his dear, noble, and loyal Guayquerias.'"⁴ In consequence there is today a large proportion of pure Guaikeria blood on the island of Margarita, and especially on the northern coast in the villages of San José de Paraguachi and Juan Griego. Humboldt also states that "next to the Caribs of Spanish Guyana, it is the finest race of men on Terra Firma," meaning the inhabitants of the suburbs of Cumana as well as those of Margarita. This is in strange contrast to the ill-advised statement of Scruggs, who, on hearsay, says, "The inhabitants are exceptionally indolent, stupid, unenterprising and improvident,"⁵ a description with which the present writer can by

¹ Herrera, op. cit., dec. I, book IV, chap. II.

² Ibid., dec. II, book X, chap. V.

³ Girolamo Benzoni, *History of the New World*, Rear-Admiral Smyth's transl., *Hakluyt Society Publications*, London, 1857, p. 3.

⁴ Humboldt, op. cit., vol. II, p. 44.

⁵ William L. Scruggs, *The Colombian and Venezuelan Republics*, Boston, 1910, p. 201.

no means agree, as he found the inhabitants of Margarita—both the original Guaiquerias and the Spanish-Americans—to be particularly industrious. Owing to the absence of rivers, Margarita is bleak and barren, and hence the inhabitants are impoverished, a condition especially apparent since the pearl fisheries are no longer very productive. Altogether the Margariteños are a far more industrious class of people than is generally found in the West Indies.

It is likely that the settlements on Margarita received important accessions when Nueva Cadiz on Cubagua was completely destroyed by earthquake and a tidal wave in 1543. The Royal Treasury was kept on Margarita after the year named, and on one occasion, in 1561, was robbed by Lope de Aguirre,¹ a traitor to the Spanish Crown, after whom a small settlement on Margarita at the place where Aguirre made his landing is still called El Tirano.² In fact, this region became of such strategic and commercial importance that the island of Coche, between Margarita and the mainland, where salt deposits are found, was sacked by the English expedition under Captains Amias Preston and George Somers in 1595, and the settlements on Margarita were destroyed by the Dutch in 1662.³

It was probably soon after the latter event that the island lost its first importance, although the pearl fisheries had long since been exhausted owing to indiscriminate fishing even during the spawning seasons. There was never enough soil on the island to permit sufficient agriculture for the support of a considerable population, hence during the next century and a half, although continued as a Spanish province, Margarita was not of commercial importance and it did not figure largely in the annals of history. The island came into prominence again from 1813 until 1818 when it heroically defended itself against the greatly superior Spanish forces sent to wrest from the revolutionists their newly-declared independence. Undoubtedly the most heroic figure in this struggle of the piti-

¹ Andrés A. Level, *Esbozos de Venezuela, Primer Esbozo: La Margarita*, Caracas, 1881, p. 69.

² *Ibid.*, p. lvii.

³ Codazzi, *op. cit.*, p. 598.

fully small forces of the Margariteños against overwhelming odds was Doña Luisa Caceres de Arismendi, wife of Colonel Juan Bautista Arismendi, one of the leaders in the revolutionary movement. Margarita was captured by Morillo in 1815, but was in revolt again the next year, after the Spanish officers had broken their pledges of amnesty. Simon Bolivar, the great revolutionary leader and founder of five South American republics, visited the island in 1816 and held a conference with the revolutionary chiefs in the Pueblo de Santa Ana, now known as El Norte. The island was again invaded by the Spaniards on July 17, 1817, but despite their superior numbers they were signally defeated by the insurgent forces and finally compelled to evacuate the island a month later.¹

PHYSICAL FEATURES

Mention is made by the earliest historians that Margarita lacked a suitable supply of water. Herrera wrote that the island "does not have an abundance of water, although it is fertile of grass for cattle."² Depons mentions that "the nature of its soil condemned it to be forever a languishing establishment. Instead of vegetative earth, it is covered with a sandy surface nearly a foot in depth, mixed with hollow and rotten madrepores. Cultivation holds out no hopes."³ Scruggs states that "the first view of the island from the sea is one of matchless beauty, but it will hardly bear closer acquaintance. The soil is arid and non-productive."⁴ Speaking in general, the writer found these statements to be true; indeed it would be hard to describe the desolate appearance of the greater part of the island. In those places where various cacti are not the prevalent growth, one sees large sandy savannas covered with dry and scrubby broom-grass, with here and there a stunted tree that seems to find the struggle for life almost too great for endurance. In other parts the soil consists of indurated clay covered with decomposing micaceous rock. The roads are bare stretches of sand,

¹ Level, op. cit., p. xxi.

² Herrera, op. cit., Description, vol. 1, chap. vii.

³ F. Depons, *A Voyage to the Eastern Part of Terra Firma or the Spanish Main*, New York, 1806, vol. III, pp. 172-173.

⁴ Scruggs, op. cit., p. 201.

with not a tree to temper the glare of the tropical sun. The progress on these roads through dust a foot deep is indescribably difficult.

One can say that there are no rivers on the island, although there are three stream-beds that give promise of filling during the rainy season. The springs of these former rivers have been piped to large reservoirs in the mountains, which in turn supply water to the towns of El Valle, Porlamar, and Pampatar. Even thus, the supply is uncertain and scant under the best conditions. It is possible that in pre-Columbian times the rainfall was somewhat greater, but that it diminished after the Spanish conquest when the mountains were denuded of their timber. From the geological structure of the mountains, however, it would appear that even in early times large parts of the island presented the same bleak and arid appearance that they do today. One is especially impressed by the lack of vegetation on the hill-slopes and the consequent failure of the hills and mountains to store the rainfall.

ARCHEOLOGICAL INVESTIGATIONS

Unlike some of the other West India islands, where large aboriginal shell-deposits are found, the greater part of the investigation on Margarita was confined necessarily to surface work. The writer has already mentioned the scarcity of soil suitable for cultivation. In consequence of this, with the exception of some artifacts found on a small village-site in the northern part of the island, the entire Margarita collection consists of "surface-finds." These superficial investigations necessitated visiting all settlements in order to make inquiry among the natives with a view of learning whether they possessed any Indian objects. The Margariteños, and especially the women and children who go about gathering firewood, are remarkably keen-sighted, readily perceiving any foreign object lying on the ground, hence one may find carefully guarded stone axes and petaloid celts in many of the native huts. These people attribute the usual supernatural properties to objects of this kind, superstitions that do not differ materially from those previously described by the writer.¹ Unlike the inhabitants of some of the other

¹ T. de Booy, "Certain West-Indian Superstitions Pertaining to Celts," *Journal of American Folk-Lore*, vol. xxviii, Jan.-Mar. 1915, pp. 78-82, and *Contributions from the Museum of the American Indian (Heye Foundation)*, vol. II, no. 3, 1915.

islands, they appear to be more willing to dispose of these stones at prices far from exorbitant; in fact, in some instances the stones were freely given.

Stone artifacts were collected in practically all parts of Marga-



FIG. 2.—An artificial reservoir at San Antonio.

rita, but it was especially on the southern coast, in the San Antonio region, that potsherds were found. Of all parts of Margarita, excepting Macanao, San Antonio perhaps presents the bleakest appearance, and one cannot observe even the smallest cultivated patch of ground. The inhabitants eke out a livelihood by raising goats, and in making charcoal from the small trees which they cut from the hillslopes. They also cure large quantities of fish, and hire themselves as pearl-fishers. The only vegetation seen on the plains of San Antonio is cacti, impenetrable in places

and of several varieties. Scattered among this growth one often finds sherds of aboriginal pottery, the only indication of the sites of former villages. Patient and laborious search rewards the investigator with little of consequence, however, for during the lapse of centuries the comparatively brittle earthenware has become greatly disintegrated.

The native guides were especially emphatic in their assurance that a large number of shallow depressions found in this part of the island were due to excavations by the pre-Columbian aborigines for the purpose of catching and preserving rainwater, and the writer is inclined to believe that their statements are correct. The reservoir shown in figure 2 has the appearance of the slope of a small hill; but by drawing an imaginary line across the shoulders of the two guides and continuing it circularly through the more highly lighted part of the picture, in the foreground, through the cactus plant, one may gain an idea of a depression of this kind. The reservoirs have a uniform depth of approximately 6 feet, with a diameter of 20 feet at the bottom and about 65 feet at the top. In some instances the soil from the excavation may still be seen around the top, as if placed there to heighten the receptacle; but in most cases this surrounding mound has become obliterated. The guides called these structures "arroyos," the Spanish term for gullies.

Mosquito Point, also on the southern coast of Margarita, seems to have been a favorite abode of the aborigines. The scenery here differs but little from that of San Antonio, although the small sand-dunes bordering the shore give it an even more desolate appearance. The coast here is ideally adapted to the needs of a fisherman, and it would be an easy matter to launch canoes and to haul them ashore. One cannot, however, give an adequate impression of the heat of these localities: the intense radiation from the sand and the stones, and the total lack of shade, must have made life here a burden indeed. It is on these shores that large deposits of the shells of the pearl-mollusk (*Meleagrina margaritifera*) are found. The writer partly excavated a few of these, but was not successful in uncovering artifacts of any description. These excavations were not difficult, for while the soil immediately back of the shore is as hard as that farther inland, the shell deposits are found only on the dunes that fringe the sea. In one of these excavations a clearly defined layer of ashes extending through the shell deposit was exposed, and while the reason for making a fire on top of the shells during the growth of the heap is not known, excavation did not afford evidence to warrant the assertion that the

shell deposit was of aboriginal origin. These shell-heaps therefore can be explained only by the belief that they resulted from early Spanish pearl fisheries. They differ from the modern shell-heaps made on the island today, in that the shells have become mixed with the drifting sand of the shore and that they have lost their luster through long exposure to the elements.

Unlike so many of the West India islands, caves are not found on Margarita, owing to the absence of coralline limestone. The



FIG. 3.—Shell deposit at Mosquito Point.

only limestone outcrop on the island is Mount Macuspo, four miles east of Laguna Chica, the whiteness of which, in strong contrast to the brownstone Cerro de la Vega, makes it visible from afar. Isla Blanca, a small *cayo*, or key, eastward from Moreno Point, is also of limestone formation, but guano-hunters who have visited it informed the writer that it contains no caves. A trip was made to Mount Macuspo and careful search conducted both at the foot and throughout the slopes in the hope of finding caves, but none were discovered.

Another region in which a number of artifacts was found is the mountainous district of La Sierra. It is here that practically all the agriculture of the island is conducted, and this is by far its most attractive part. It is certain that the shore-dwelling aborigines came here for their cassava harvest, and more than likely that here also they made their cassava bread, judging from the number of griddle fragments found in the vicinity. No kitchen-middens and no shell deposits were found, although shells scattered here and there indicated that the aborigines ate sea-food even in the interior of the island. Mention should here be made of the finding of four massive stone mortars, but no other artifacts, within a hundred yards of a small mountain spring in this district.

A fairly large number of shells and sherds were found on a bleak hillside in the mountain range between El Valle and Asunción. This hill has a very pointed crest, and the slope on which the remains were found has an angle of almost 60 degrees, which makes its use as a village-site rather remarkable. Were the summit of the hill a plateau large enough to afford space for a couple of huts, one might assume that the shells and other remains found on the slope had been washed there by rain; but the contrary being the case, no suggestion of a reason for the occurrence of the objects referred to on the slope can be offered.

The largest shell deposits, and those that showed unquestionable evidence of pre-Columbian occupancy, were discovered near the village of San José de Paraguachi. The dry bed of the Rio Viejo, about 8 feet deep and 12 feet wide, which fills during the rainy season and originates on the slopes of the Traga Plata mountain, whence it winds its way through an enclosed valley to the sea, passes through a subdivision of San José de Paraguachi, called Giri-gire. It is probable that Giri-gire was the native designation of the aboriginal village on this site, and that it has been preserved and transmitted by the Guaikeria Indians still living in the neighborhood. The river-bed is the dividing-line of two properties, owned respectively by Señora Prudencia Carajalvo and Señor Madeira, the latter property being known as "La Estancia." On both banks kitchen-middens were found. A large field on the eastern side of the river,

the Caravaljo property, was not under cultivation during the writer's visit, but sugar-cane and cassava had been planted there at one time. There was no superficial evidence of the prehistoric occupancy of the village-site in this field, aside from some sherds and shells lying here and there, and the middens on the same side

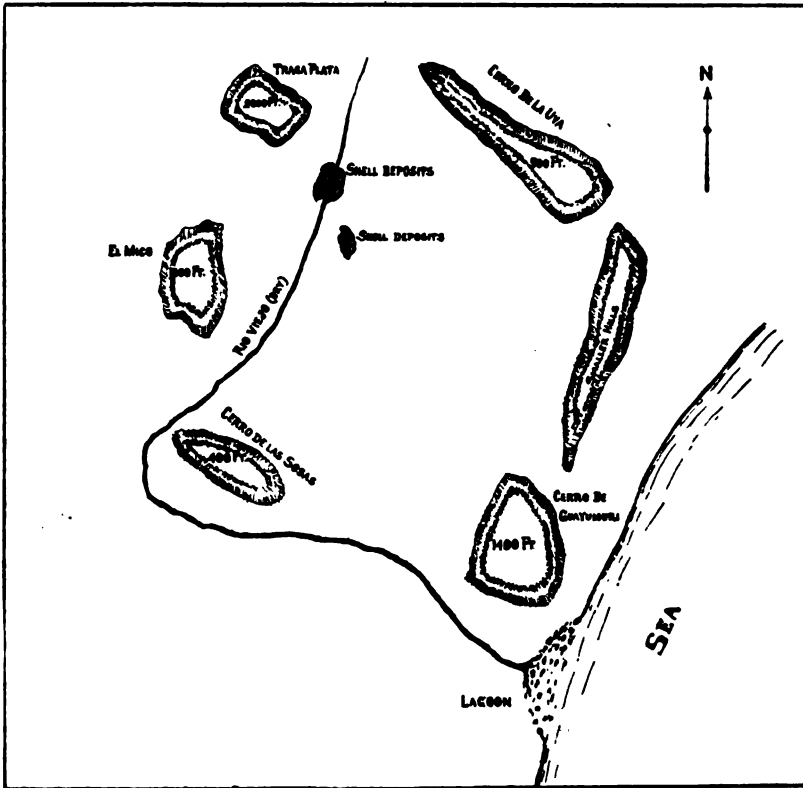


FIG. 4.—Situation of the Giri-gire kitchen-middens. (The map is not drawn to scale.)

of the stream-bed had no definable contour, consequently it was necessary to determine the extent of these remains by means of test-holes.

The middens on the western bank of the river-bed were likewise investigated, but in appearance they did not differ from those on the opposite side. The village-site extends for about half a mile along each bank, and is not more than a quarter of a mile in

width. It consists of individual deposits about 60 feet in diameter, which merge into one another. There are two or three middens in the large field of Señora Caravaljo, about three hundred yards from the river-bank above referred to. This site is not more than two miles and a half from the sea, but by following the mountain path it is about five miles from El Tirano, the nearest seaport.

The shell deposits of Giri-gire are covered by about a foot of diluvial deposit. There are no clearly defined layers of shells and ashes, all being mixed together, with an occasional sherd or other artifact. This mixture does not exceed a foot in depth, and in many instances it is even less. Very few stones were found with the midden débris, nor were bones plentiful. The deposit was so compact that shells, ashes, charcoal, bones, and artifacts adhered together in large, hard lumps. It is noteworthy that no fragments of the clay griddles, such as are found so generally throughout the West Indies, occurred in these deposits, although many such fragments were collected in other parts of Margarita. This absence of griddle fragments from the Giri-gire middens, however, is not necessarily an indication that the site was occupied by Indians of a culture distinct from that of the aboriginal occupants of sites in other parts of the island; for the two-pointed stones, later to be mentioned, which appear to be typical of the pre-Columbian inhabitants of Margarita, were found in large numbers on the Giri-gire site as well as in other parts of the island.

A number of fragments of human bones, almost invariably split as if to abstract the marrow, were found. As above pointed out, the writer believes that these bones are the evidences of a raid on the Guaiqueria by Carib from the islands to the eastward, who held their cannibal feast on the site of the destroyed village of their victims.

The writer is indebted to Mr L. P. Gratacap, of the American Museum of Natural History, for the identification of the following sea-shells found in the Giri gire kitchen-middens. It will be noted that about ninety-five per cent. of the shells are of one species and possibly four per cent. of another, while the remainder were found in extremely small numbers.

<i>Mytilus achatinus</i> , Lamarck	95%
<i>Tivela mactroides</i> , Born	4%
<i>Fissuridea virescens</i> , Sowerby	1%
<i>Murex rosarium</i> , Chemnitz	
<i>Purpura floridanus</i> , Conrad	
<i>Purpura patula</i> , Linnæus	
<i>Purpura hamastoma</i> , Linnæus	
<i>Fasciolaria tulipa</i> , Linnæus	
<i>Strombus gigas</i> , Linnæus	
<i>Cypræa exanthema</i> , Linnæus	
<i>Livona pica</i> , Linnæus	
<i>Melongena melongena</i> , Linnæus	1%
<i>Chama macrophylla</i> , Chemnitz	
<i>Cardium muricatum</i> , Linnæus	

Besides these shells, some barnacles and many stems of madre-pore coral were found.

In addition to the human bones, a number of bones of lower mammals were found, some of which were kindly identified by Dr F. A. Lucas, Director of the American Museum of Natural History. The identified bones are those of the peccary (*Pecari* sp.) and the deer (*Odocoileus* sp.). Turtle-bones also were found, and some bones that resembled those of birds, although the identification of these is uncertain. Besides the above, some skeletal remains of fish, amongst which are those of the bluefish (*Pomatomus saltatrix*), were recovered.

THE COLLECTIONS

While a large number of pottery fragments were found in Margarita, the writer was successful in obtaining only two entire vessels of pre-Columbian origin. These are shown in plate 1. Of the two, *a* was brought by a woman who said it had been discovered by her son while cutting firewood on top of one of the mountains bordering Cerro de la Vega. A subsequent visit to this locality resulted in finding many sherds, but no more entire vessels. The receptacle is of dark-brown ware, about a quarter of an inch thick. It stands 5 inches high, and the diameter of the mouth is 4 inches. An inspection of the sherds from the island indicates that this type of small pitcher was not uncommon.

The other entire vessel (pl. 1, *b*) is of a type entirely foreign to either the West Indies or the adjacent mainland of South America.



a



b

PREHISTORIC POTTERY VESSELS

It stands $2\frac{1}{4}$ inches high, is $4\frac{1}{2}$ inches long at the base, and $3\frac{1}{4}$ inches in diameter at the mouth. The inside depth of the vessel is almost 2 inches. This "foot-jar" of heavy, dark-brown pottery, is well modeled, the five toes with their nails and the ankle of the foot being clearly represented. No other sherds that indicate the existence of other vessels of this type were found. The foot-jar was found in excavating one of the Giri-gire kitchen-middens. Although far superior in design, in type it resembles the foot-jars from Oaxaca, Mexico.

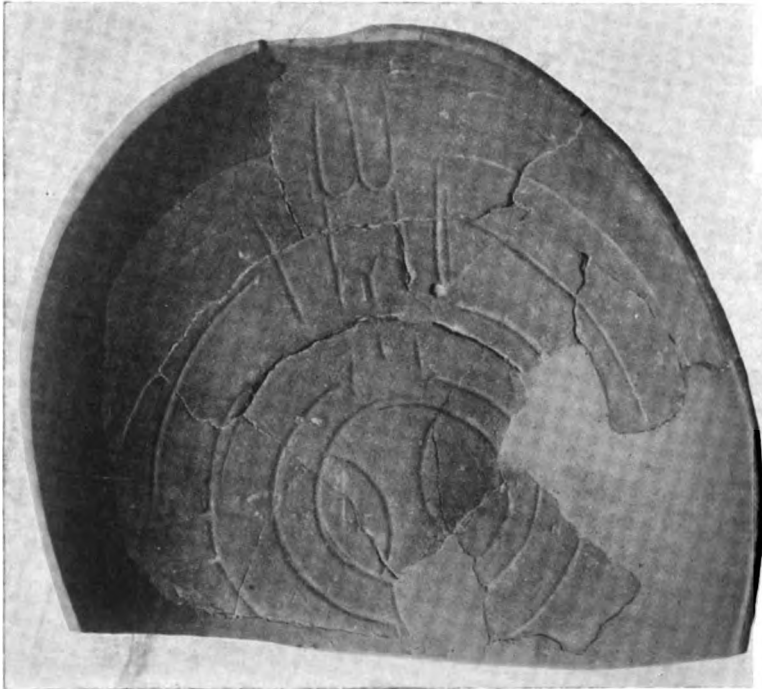


FIG. 5.—Shallow bowl from a Giri-gire kitchen-midden.

From fragments found, the vessel shown in figure 5 was partly reconstructed. This shallow, elliptical bowl, which originally had a length of 11 inches, a width of 8 inches, and stood 2 inches high, is made of dark-gray ware of a thickness of three-sixteenths of an inch. The outer surface is plain, but the interior is decorated with

shallow, incised, circular lines. The fragments of this specimen were recovered from one of the Giri-gire middens.

Excavation in the Giri-gire middens produced also a number of pottery heads similar to those from the West Indies, and also more or less allied in type to some of the heads collected by Dr Fewkes at Erin Bay, Trinidad.¹ It should be noted that most of the heads illustrated by Dr Fewkes are painted, while the Giri-gire examples do not now indicate painted decoration, although it may be that originally they were so ornamented. A close comparison of head *c* of our plate II with head *f* shown in plate XVII of Dr Fewkes' article, and of heads *e* and *f* of plate II of the present paper with heads *c* and *e* of plate XIX of Dr Fewkes' paper, will reveal this similarity. The writer recovered by excavation a large number of pottery heads on the St Bernard estate near Cape Mayaro, Trinidad, where he spent four months in archeological research after the termination of the Margarita work, and these show even greater similarity to the Margarita specimens.²

Little information can be given in regard to the other heads illustrated in plate II. Often the identification of such pottery heads as representing certain animal forms appears to be fanciful. More than likely *b* and *f* represent human heads, while *e* may be supposed to have been intended to portray the head of a bat.

The manner in which these heads served as handles for the vessels to which they were attached is shown in plate II, *h*. Frequently the heads are hollow and served as rattles, containing a number of clay pellets. Another type of handle is shown in plate II, *g*, of which a number of examples were found. Plate II, *a*, exhibits one of the supports of a vessel, shaped in the form of a human foot, with incised lines representing the toes. The ankle is clearly shown.

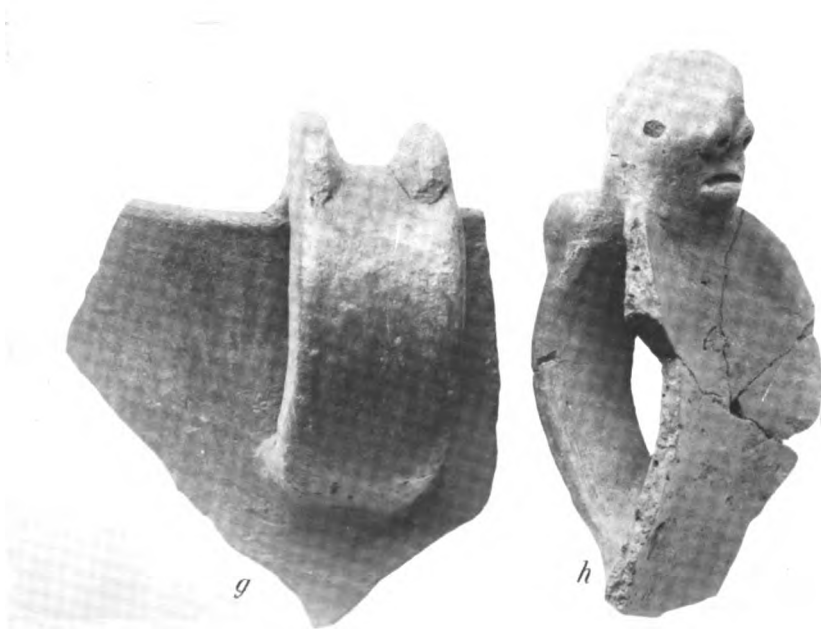
The majority of sherds found throughout Margarita indicate that the typical vessel was severely plain, having indeed no decoration whatsoever. It may of course be possible that the surface of

¹ J. Walter Fewkes, "Prehistoric Objects from a Shell-heap at Erin Bay, Trinidad," *American Anthropologist*, N. S., vol. XVI, no. 2, April-June 1914, pp. 200-221; also in *Contributions from the Heye Museum*, vol. I, no. 7, 1914.

² The writer hopes to publish the results of his researches in Trinidad in the near future and to incorporate a detailed account of this similarity.



HEADS OF POTTERY



HANDLES OF POTTERY

some of the vessels was decorated with painted designs, but that exposure to the elements has caused their disappearance. The usual incised lines with a small impressed pit at their extremities were found in no instance. Figure 6 illustrates three sherds which may

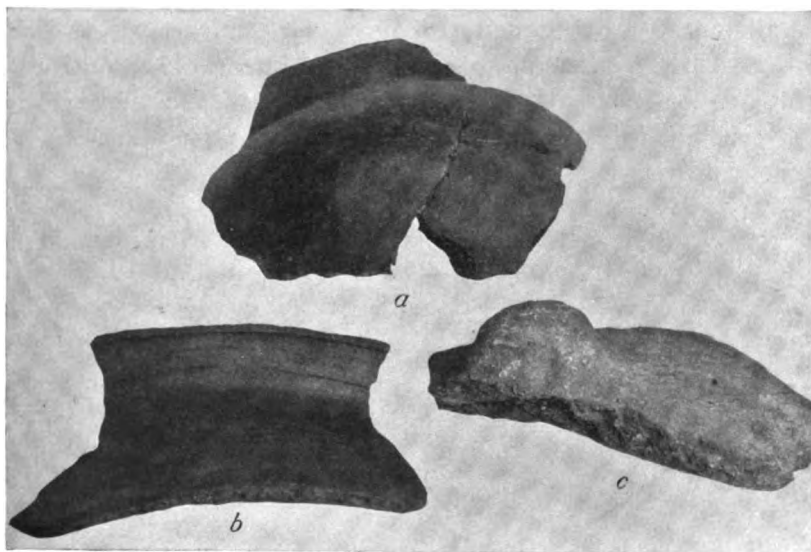


FIG. 6.—Potsherds.

be regarded as typical of all specimens of this kind collected. Of these, *a* is a fragment of a globular vessel with a perpendicular rim; *b*, a fragment of a larger vessel with a diameter of about 16 inches and a height of about 12 inches, and with a slightly outcurving rim; *c* is of a different kind of pottery, the clay of which was plentifully tempered with minute stone chips and crushed shell. It will be noted that this fragment is far thicker than the others. Probably half of all the sherds found were of this kind of ware. The vessels made of this seem to have had straight sides, and, surrounding the rim, frequently had small lugs of the same kind as the one shown in specimen *c*.

Three fragments of vessels (fig. 7) were found in the Giri-gire kitchen-middens that were colored with red, white, and brown pigment, applied to the ware before firing. Probably six hundred

sherds entirely similar to these were found in the middens on the St Bernard estate in Trinidad, suggesting that the Carib raiders previously mentioned left some of their pottery on the site they had destroyed. This suggestion is well worthy of consideration when it is remembered that other sherds of exactly the same kind of pottery have been found on some of the Carib islands, as Carriacou and St Vincent, and are now in the Museum of the American Indian. Sherds of this variety have not been found anywhere in Trinidad, however, except in the middens near Cape Mayaro.

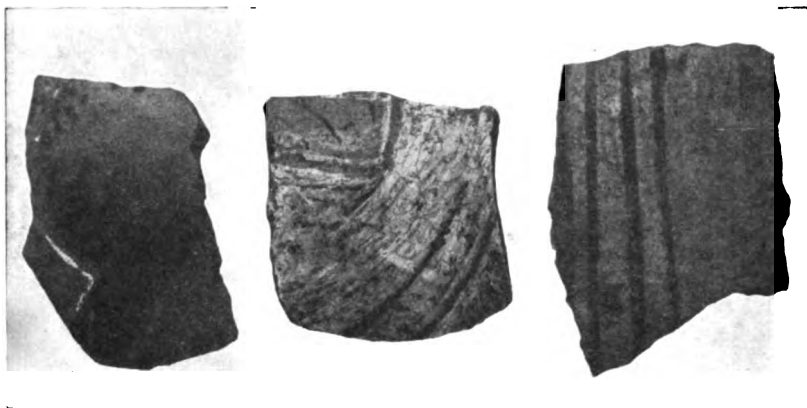
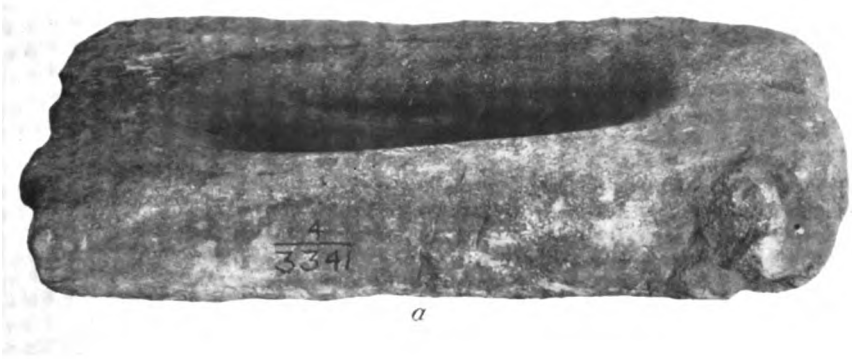


FIG. 7.—Sherds of painted pottery.

The writer figured a fragment of a clay griddle from Jamaica in a previous article on the archeology of that island,¹ and in another paper² mentioned a similar discovery in Santo Domingo. Clay griddles were found likewise in Margarita (fig. 8), and a considerable number of fragments were collected on that island. These do not differ in any respect from the sherds in the collections of the Museum of the American Indian from Cuba, Jamaica, Santo Domingo, Trinidad, and several of the Lesser Antilles. It is interesting to

¹ "Certain Kitchen-middens in Jamaica," *American Anthropologist*, N. S., vol. xv, no. 3, July-Sept. 1913, p. 434; also in *Contributions from the Heye Museum*, vol. 1, no. 3, 1913.

² "Pottery from Certain Caves in Eastern Santo Domingo," *ibid.*, vol. xvii, no. 1, Jan.-Mar. 1915, p. 94; also in *Contributions from the Heye Museum*, vol. 1, no. 9, 1915.



STONE MORTARS

note the general distribution of this type of artifacts throughout the islands, regardless of whether they were inhabited by the Carib or the Arawak.

A number of massive mortars were found in Margarita, two of which are illustrated in plate III. The first and largest specimen (*a*) is 25 inches long, 13 inches wide, and averages $5\frac{1}{2}$ inches in height. The cavity, as in all the Margarita mortars, is elongate.

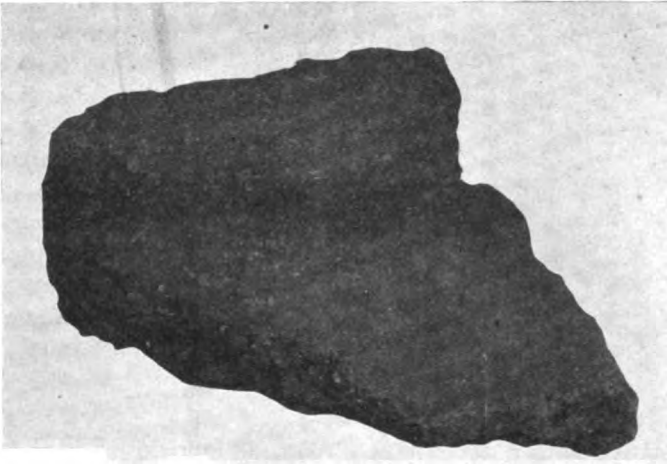


FIG. 8.—Fragment of a clay griddle.

Specimen *b* is much smaller and more disc-shaped; its length is 16 inches, width $11\frac{1}{2}$ inches, and average height 3 inches. The cavity is elongate, as in the others, and the commencement of another cavity, at a right angle to the first, can be seen. With many of these mortars were found handstones, of which three are shown in figure 9. The grinding surface of these stones is flattened, while the side which was held in the hand is convex. The length of the examples here shown is 6 inches, although a number were collected that are about an inch longer. A considerable number of handstones were found throughout the island.

To the present time, there is no authentic record of the finding of a single chipped arrowpoint in the West Indies. The writer therefore

was greatly interested in acquiring from Margarita the chipped quartzite arrowpoint, an inch and a quarter in length, shown in figure 10. No similar specimens were discovered, although one or two chipped flints were found. That the Guaiqueria Indians used



FIG. 9.—Handstones.

harpoons or arrows is proved by their name, derived from *guaike*, meaning "pointed pole," as already mentioned. Furthermore, the writer acquired two arrowshaft rubbers on the island: these are



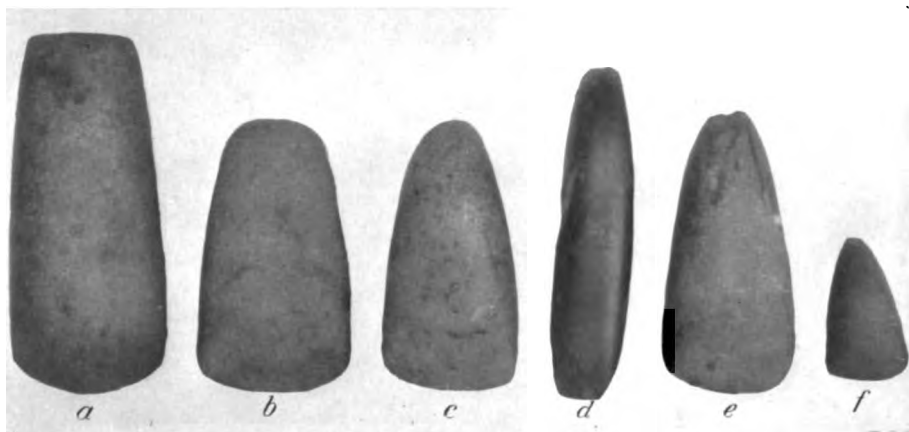
FIG. 10.—
Chipped
quartzite ar-
rowpoint.

illustrated in figure 11. The tip of the arrowpoint shown in the illustration is broken off, and the point itself is in no sense remarkable. Nevertheless, the value of this unique specimen is evident, and it would be interesting to know whether similar chipped points exist on the adjacent mainland. The two rubbers referred to are of coarse-grained stone and are not unlike specimens from the United States.¹ The Guaiqueria Indian probably tipped his arrow with the poisonous spine of the sting-ray, which is still used extensively for the same purpose by the primitive tribes on the northern coast of South America.

¹ "Handbook of American Indians," *Bulletin 30, Bureau of American Ethnology*, Washington, 1907, pt. 1, p. 92.



TWO-POINTED OBJECTS



CELTS OF STONE

Another problem was presented by the finding of a large number of two-pointed stones of the type shown in plate iv. These objects are $1\frac{3}{4}$ to $2\frac{1}{4}$ inches in length, and one measures $2\frac{3}{4}$ inches. They are either elliptical or circular in cross-section; most of them are of the latter form. The writer knows of only a single two-pointed stone of this type from elsewhere in the West Indies; this is from Grenada

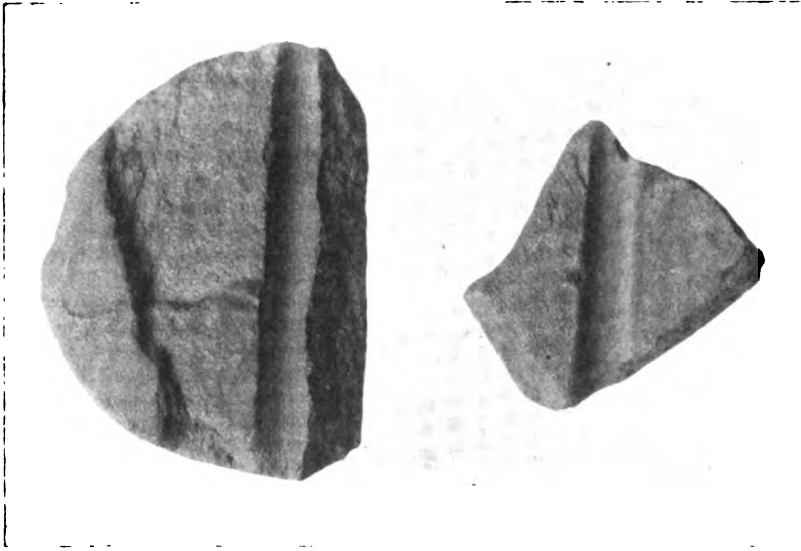


FIG. 11.—Arrowshaft rubbers.

and is also in the Museum of the American Indian, which likewise possesses a few similar stones from California. While these two-pointed stones are still to be regarded as problematical objects, attention should be called to the fact that if one of them is twirled between the fingers on a smooth surface, it will spin for a considerable time; hence it is not impossible that they may have been used in games or in ceremonies of divination. Nevertheless these stones present an interesting problem in West Indian archeology, both from the comparatively large number (twenty-eight) that were found in Margarita, and from their shape.

The usual types of West Indian celts were also found in Margarita. These vary from the flat-topped example (pl. iv, *a*) to the

smallest petaloid form (*f*). These celts do not differ from those found on any of the other islands, although all types, including the

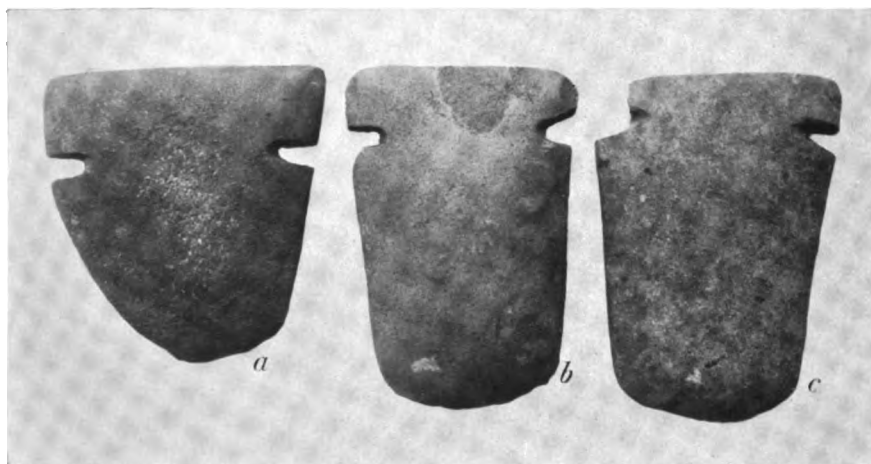


FIG. 12.—Massive axe.

comparatively rare spindle-shaped celt (*d*), were gathered. A few celts from Margarita are made from the lip of the conch.

A number of massive axes, of which some are shown in plate v, *d*, *e*, *f*, were found; these differ from the axes found on the islands to the eastward. These implements have a smooth, polished rounded head, and a shallow groove to facilitate hafting. Most of the specimens show signs of use. They range in length from $6\frac{1}{2}$ to 7 inches.

The Guiana or Brazil type of axe, of which specimens are shown in plate v, *a*, *b*, *c*, was also found in Margarita. In the Museum of the American Indian are a few



STONE AXES



WORKED CONCH-SHELL LIPS

examples of this type from Trinidad, one of which has been figured by Dr Fewkes,¹ and there is also a specimen from Grenada. The area of the surface where the axe was lashed to the handle is slightly concave in order to facilitate the fastening, a feature common to axes of this form. It has been the custom of the writer to refer to these axes as of the Guiana or Brazil type, as they are found in large numbers in the great region between the mouths of the Orinoco and the Amazon. The axes have also two notches through which the lashing has passed round the handle. Specimen *a* shows evidence of secondary use, as if employed as a rubbing stone. The length of these axes ranges from $4\frac{1}{2}$ to 5 inches, with the exception of one from Trinidad which is only 3 inches long.

Still another axe of massive type was found in Margarita; this is shown in figure 12. In outline it approaches *d*, *e*, and *f* of plate v, but the groove for the hafting is accentuated, and the length of the implement is 8 inches. The example illustrated is the only one of its kind collected in Margarita, but one like it was procured from Rio Caribe on the peninsula of Paria. There is also an axe of this type from Trinidad in the collections of the Museum of the American Indian.

The only axe from Margarita that approaches the types found in the Lesser Antilles is that shown in figure 13. This miniature implement is only two inches long, but it is identical in form with a number of larger axes from St Vincent, Grenada, and some of the other islands of the Lesser Antilles. A groove surrounds the butt-end, and another groove, not shown in the illustration, extends across the proximal surface.

Only a few objects for personal adornment were found in Margarita. One of these is a small amulet of Amazon stone (fig. 14), which probably represents a highly conventionalized animal form.



FIG. 13.—Miniature axe.

¹ J. Walter Fewkes, op. cit., p. 216.

The amulet is $1\frac{3}{4}$ inches in length, is of excellent workmanship, and is drilled for suspension. A shallow pit on each side, above the perforation, may represent the eyes, and under the perforation another pit may have been designed to indicate a nostril. This is the only specimen of Amazon stone found in Margarita.



FIG. 14.—Amulet.

A number of worked conch-shell lips, which may be included among the personal ornaments, were found. Two of these are shown in plate VI, *c, d*. These objects were used probably as pendants. They are far cruder than specimens *a* and *b* of plate VI,

also in the Museum of the American Indian, from the Andes region of Venezuela, but are similar in type. The reverse side of *b* is elaborately carved with designs representing human heads; the Margarita specimens are all like specimen *a*, which is devoid of carving. Unlike those from Margarita, the Andean pendants are drilled for suspension; the Margarita specimens, however, narrow slightly at the point where the tongue joins the body of the pendant. A number of pendants made from the lips of conch-shells are figured by Giglioli;¹ that shown in his figure 4 especially resembles those from the Venezuelan Andes above referred to. In all eleven pendants of the kind figured in plate VI, *c, d*, were collected in Margarita.

A single object of hematite (fig. 15) was found in Margarita; it measures $1\frac{3}{4}$ inches in length, is plummet-shaped, and has a small groove at top and bottom.

A fragmentary bell-shaped pestle (pl. VII, *a*), but no entire specimen of this class, was found. This pestle, which is 5 inches in

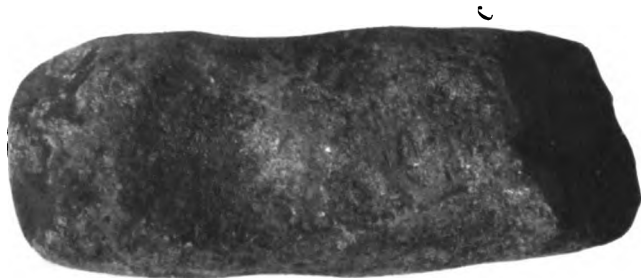
¹ E. H. Giglioli, "Di certi singolari pettorali in pietra ed in conchiglia precolombiani dalla Venezuela, probabili effigi del dio Vampiro degli antichi indigeni dell' America centrale," *Proceedings International Congress of Americanists*, 16th Sess., Vienna, 1908, vol. II, pp. 321-330, Vienna, 1910.



a



b



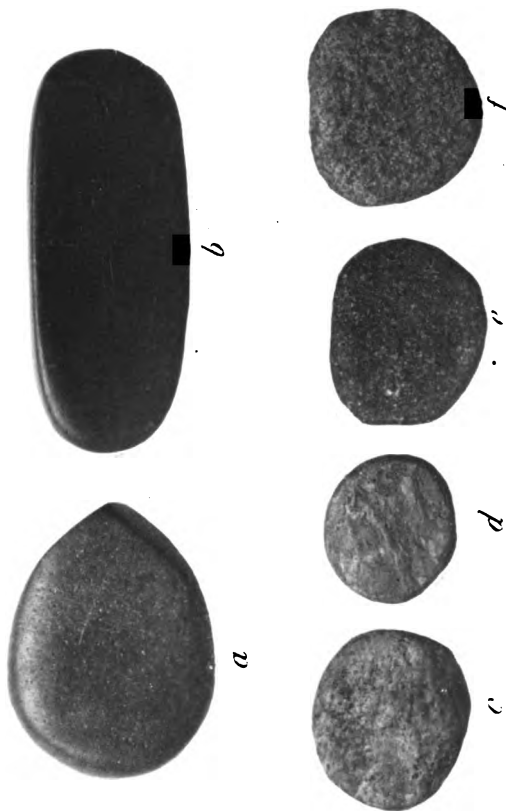
c



d

PESTLE (*a*) AND HAMMERSTONE (*b*)

STONE OBJECT OF UNKNOWN USE (*c*), AND HAMMERSTONE (*d*)



RUBBING STONES

length, recalls similar objects from St Vincent and Grenada, in the Museum of the American Indian.

An unusual hammerstone, 7 inches long, with two grooves, is shown in plate VII, *b*. This form of hammerstone is probably unique. One of the surfaces of the longer axis is slightly flattened, as if to facilitate the lashing of a handle.

In the same plate (*c*) is figured a stone object of unknown use, 5 inches in length, with two shallow pits, one of which is shown in the illustration. The hammerstone (*d*) shown in this plate is slightly grooved round the middle and has a shallow pit at each end. The length of this hammer is $2\frac{3}{4}$ inches, the diameter $2\frac{1}{2}$ inches.



FIG. 15.—Hematite object.

A number of rubbing-stones are shown in plate VIII. Of the smaller stones, *c*, *d*, *e*, and *f* resemble circular discs and range in diameter from one inch to an inch and a quarter. Another rubbing stone (*a*), shaped like a petaloid celt, is 2 inches long and has a rubbing surface on each side of the point. Still another (*b*) is $2\frac{3}{4}$ inches long, and was probably used for smoothing pottery.

It has been seen from the foregoing description of the archaeological objects from Margarita that a number resemble specimens from the Carib islands to the eastward. It should not be assumed, however, that the ancient inhabitants of Margarita were necessarily of the same stock as those of the latter islands.

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MONOLITHIC AXES AND THEIR DISTRIBUTION IN ANCIENT AMERICA

BY

MARSHALL H. SAVILLE

THE object of this paper is to bring together, for comparative purposes, outline drawings of stone objects, each representing an axe and its handle carved from a single stone. Although a few specimens of this character have been known for more than forty years, it is thought that the widespread distribution of this peculiar type of artifact has not hitherto been brought to the attention of students. (See sketch map, fig. 1.) Many of the twenty-four specimens here represented are illustrated for the first time. More than half of the monolithic axes which we have thus assembled are from the West Indies. Six are shown from the southern part of the United States, but there are several of which we have not been able to obtain information respecting the exact localities whence they came. Two are from the northern shores of South America, and three are from the eastern coast of Central America.¹ With a single exception, the axes are all of the massive polished type.

On the accompanying plates these monolithic axes are grouped by regions. The first to be described (pl. I, fig. 1) is the only chipped flint specimen in the series; it was found about twenty years ago in a remarkable cache discovered near Painted Rock in the region of Duck river, Humphreys county, Tennessee, in the center of the stone-grave district. The ceremonial character of the cache is indicated by the general occurrence of its objects in pairs, among which were two examples of monolithic axe, respectively $8\frac{3}{4}$ and

¹ The axes now referred to do not include the double-blade examples illustrated on plate VI.

9 inches in length. Both of these axes are now in the collections of the Missouri Historical Society, St. Louis.¹

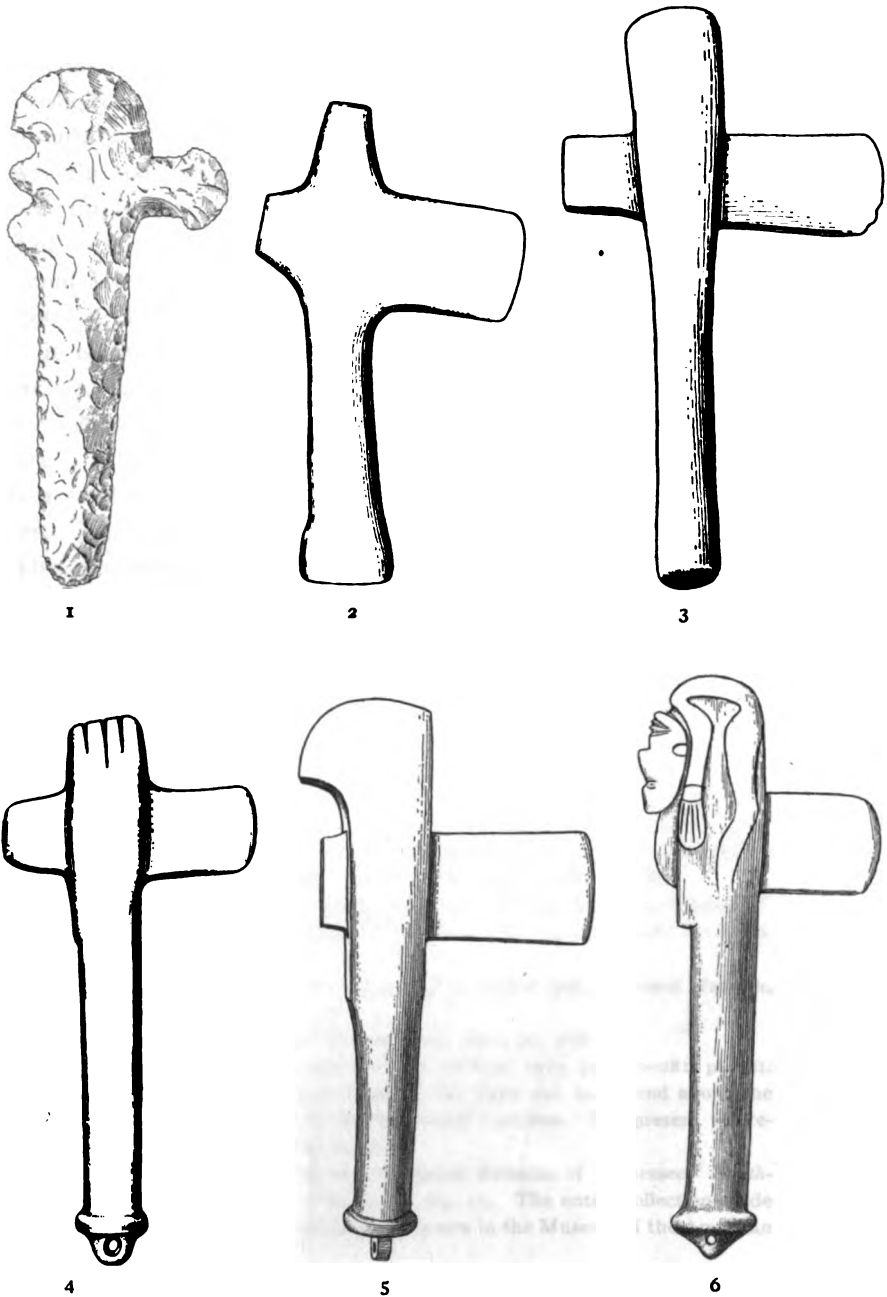
The first of the series of polished specimens, shown in figure 2



FIG. 1.—Sketch map showing distribution of monolithic axes.

of plate I, is the most recent one brought to light in the United

¹ These chipped flint ceremonial objects have been described and figured by W. J. Seever, who secured the cache for the Missouri Historical Society, St. Louis, in whose collections they are now exhibited. Mr Seever writes about this pair as follows: "Figs. 5 and 41 are certainly 'ceremonial.' . . . The form seems unique and at once suggests a sort of medieval, European battle-axe and war club combination. Both are exquisitely chipped and as near alike as two peas. The head being flat and considerably thinner than the handle, which is quite slender and rounded, the inference is drawn at once that they were used with the hand. The upper edge, has an odd,



MONOLITHIC AXES FROM SOUTHERN UNITED STATES

States; it was found by Charles S. Mason in the vicinity of Jonesboro, Polk county, Tennessee. [This axe is carved from a hard, green stone, and is $12\frac{1}{4}$ inches long. The handle is quite massive and has a slight expansion near the end. In this specimen the marked representation of the insertion of the blade in the handle is not shown, the axe blade and handle being merged into a solid, flat, carved implement.¹

The next of the series (pl. 1, 3) is now in the United States National Museum. An illustration of this specimen was published in 1896 by Thomas Wilson,² but the locality was not given. However, it is the axe mentioned by Thruston, in his *Antiquities of Tennessee*,³ as being in possession of Mr Morris of Mississippi county, Arkansas, and it was found in the Calvary mound in that county. It is $13\frac{3}{4}$ inches long, is made of olive-green diorite (?), with a medium polish, and is complete except for a few rough places. The edge is chipped apparently by use.

The axe shown in figure 4 of this plate may be regarded as the type specimen of this class of objects from the United States. It was first illustrated and described by Col. C. C. Jones in his *Antiquities of the Southern Indians*, published in 1873,⁴ and it is figured also by Dr Joseph Jones in his *Explorations of the Aboriginal Remains of Tennessee*,⁵ but in this work the drawing is different from that appearing in the former. This is known as the flaring, axe-handle-like projection with a very keen edge, the lower edge three equally wicked and keen semicircular projections and indentations." They have been better illustrated by Moorehead in *The Stone Age in North America*, figs. 161-162.

¹ Alanson Skinner has figured the Mason axe in a description of the Mason collection, published in *American Museum Journal*, vol. XIV, no. 4, April, 1914, pp. 161-162.

² Thomas Wilson, "Prehistoric Art," *Report of the United States National Museum*, 1896, pl. 31.

³ Gates P. Thruston, *Antiquities of Tennessee*, 1890, pp. 258-259.

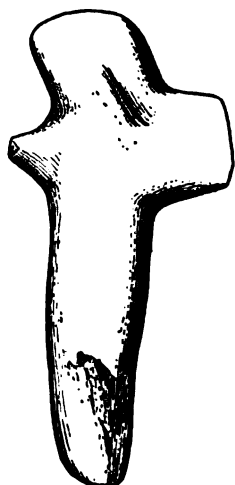
⁴ C. C. Jones, Jr., *Antiquities of the Southern Indians*, 1873, pp. 280-281, pl. XII. Jones writes that an axe similar in material to the Jones axe was found about the year 1863 in a grave mound in York district, South Carolina. The present whereabouts of this axe is unknown to the writer.

⁵ Joseph Jones, "Explorations of the Aboriginal Remains of Tennessee," *Smithsonian Contributions to Knowledge*, 1876, p. 46, fig. 11. The entire collection made by Dr Jones, on which this monograph is based, is now in the Museum of the American Indian.

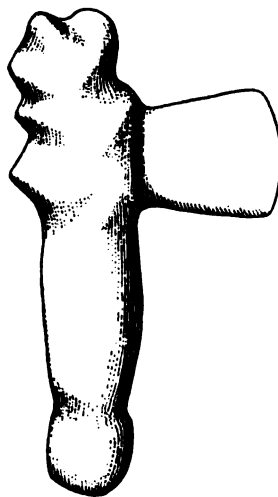
Jones axe, having been found by Dr Joseph Jones in the exploration of a mound on the eastern bank of Cumberland river, opposite Nashville, across from the mouth of Lick branch. This mound was about 10 feet high and 100 feet in diameter. In the center, three feet from the surface, was a sacrificial altar surrounded by a circle of stone graves. Near the altar, on the southern slope of the mound, were two skeletons, one of a male and the other of a female, not, however, in stone coffins. Under the skull of the male skeleton Dr Jones found the monolithic axe under consideration. This specimen is cut out of a solid piece of a compact, green, chloritic stone, and is $13\frac{3}{8}$ inches long. At the lower end is a hole, possibly for the attachment of feathers when the axe was used in ceremony. It is now in the Museum of the American Indian.

One of the most extraordinary specimens of monolithic axe has been figured and described recently by Mr Clarence B. Moore in his monograph on *Certain Aboriginal Remains of the Black Warrior River, Alabama*.¹ Mr Moore states that it was found by a colored man in plowing near one of the larger mounds at Moundville, formerly known as Carthage. This splendid axe (pl. I, 5) is of highly polished amphibolite, and measures 11.6 inches in length. It has a ring at the end of the handle like the Jones axe above mentioned. The backward curve of the handle at the upper end above the blade is characteristic of the handles of axes with copper or stone blades in ancient Mexico, as shown in the numerous representations in the codices, and which still exist, the copper blade being replaced by either iron or steel. The feature referred to, but in lesser degree, is characteristic of a number of monolithic axes from the West Indies, and is present in a stone axe with a wooden handle now in the collection of Lady Blake (pl. II, 4). This monolithic axe was obtained by Mr Moore and is now in The Academy of Natural Sciences of Philadelphia. In every respect it is one of the most beautiful and interesting examples of this class of objects that has yet been found.

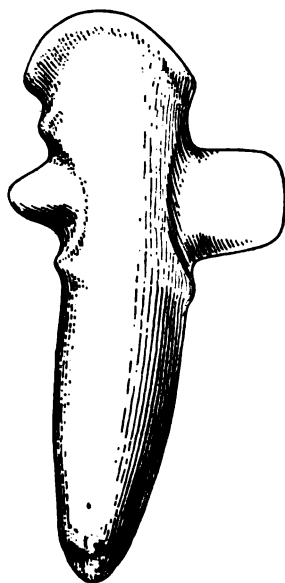
¹ Clarence B. Moore, "Certain Aboriginal Remains of the Black Warrior River," *Journal of The Academy of Natural Sciences of Philadelphia*, vol. XIII, 1905, pp. 133-135, fig. 6.



1



2



3



4

THREE MONOLITHIC AXES AND A PETALOID CELT WITH A WOODEN HANDLE,
FROM THE BAHAMAS

The splendid axe exhibited in figure 6 is in the Yale University Museum, and we have to thank Professor George Grant MacCurdy for the drawing. The locality of the specimen is not positively known, but it can be reasonably attributed to the same general region in which, from time to time, the other monolithic axes shown on plate I have been found. This axe is $11\frac{7}{8}$ inches long, and has been broken into three pieces. The handle has a hole in the end, as in the case of the Jones and Moore axes, and is rounded below the blade like the Moore axe. A unique feature is the sculptured human figure bent backward over the upper end of the handle, the well-carved head, which recalls certain Mexican masks, resting upside down and touching the butt-end of the projecting blade. In workmanship the Moore and Yale University axes are so similar in type that in all probability the same provenance should be ascribed to them.

In plates II to IV are illustrated the monolithic axes from the West Indies. In 1906 Dr Hamy published an article illustrating seven specimens from the Antilles that had come to his notice.¹ It will be observed from our study that by far the greater number of axes of this class are from the restricted area included in the lower islands of the Bahamas, Cuba, and the island of Haiti and Santo Domingo. Indeed, of the twenty-three polished stone monolithic axes herein figured, thirteen are from this part of the Antilles. Although there are thousands of stone axes from the West Indies in the collections of the Museum of the American Indian, no monolithic axes have thus far been discovered in any other part of the Antilles. We have yet to find an example in Jamaica, Porto Rico, or the Lesser Antilles.

We will now consider these West Indian examples. The first, shown in plate II, fig. 1, was discovered by Mr Theodoor de Booy² in a cave at Juba Point, Island of Providenciales, in the Caicos

¹ E. T. Hamy, "Note sur des sceptres de pierre en forme de hache emmanchée usitées chez les anciens habitants des Antilles," *Compte-rendu du XIII^e Congrès international d'Anthropologie et d'Archéologie préhistoriques*, Session de Monaco, 1906, tome II, pp. 153-162, 7 figs.

² Theodoor de Booy, "Lucayan Remains on the Caicos Islands," *American Anthropologist*, N. S., vol. XIV, no. 1, 1912, p. 91, fig. 3, c.

group of the Bahamas. This axe, which is of serpentine (not jadeite), is $7\frac{1}{2}$ inches long, and was found with potsherds, several pieces of charred wood, bones, and several conch-shells, buried beneath about eighteen inches of cave earth. The specimen is in the Museum of the American Indian.

In the private collection of Lady Blake, whose husband was formerly Governor of Jamaica, is the monolithic axe shown in plate II, 2. It is $7\frac{1}{8}$ inches long, and has been figured by Cundall.¹ This specimen was found in a guano cave deposit at Conch Bar, Grand Caicos, by a Mr Murphy of Grand Turks island.

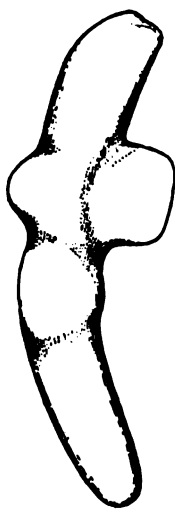
No. 3, similar to the last, is now in the American Museum of Natural History. It was long the property of George J. Gibbs, Spanish consul at Grand Turks island, was lent to the Smithsonian Institution for the purpose of making a cast, and was first figured and described by Mason² in 1876. Mason says that it was found in a cave in Caicos or Turks island, a rather ambiguous statement when we consider that the Caicos islands form a small group of keys, or *cayos*, of which Turks island is one of the smallest. Information which came with the specimen when it was purchased by the Museum, through the intermediary efforts of the late Frederick A. Ober, establishes the place of its finding in 1874 at Blue Hills on that island of the Caicos group which bears the name of Providenciales, not far from Juba Point where the de Booy axe was found in 1911. The Gibbs axe is $9\frac{3}{4}$ inches in length and is cut from a very hard, light-green stone, called jadeite by Mason; but as no analysis has yet been made, the material is uncertain. Like the Lady Blake axe it is fashioned to show the petaloid celt inserted in, and the pointed end projecting through, a stout handle.

In the paper above referred to, Mason figures a unique example of a petaloid axe still in the original handle of wood,³ one of the treasures of the Lady Blake collection. It was found in Caicos, and when first described by Mason in 1876 was in possession

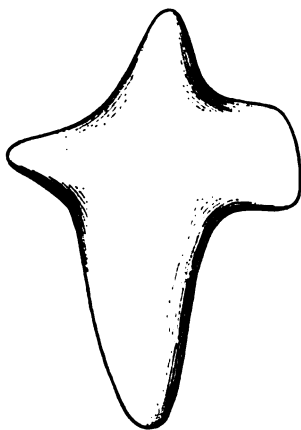
¹ Frank Cundall, "The Story of the Life of Columbus and the Discovery of Jamaica," *Journal of the Institute of Jamaica*, vol. II, no. 1, Sept. 1894, fig. 7.

² Otis T. Mason, "The Latimer Collection of Antiquities from Porto Rico," *Smithsonian Report for 1876*, fig. 11.

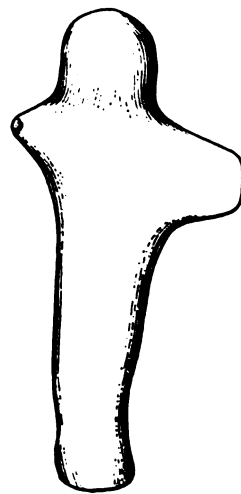
³ Op. cit., fig. 12.



1



2



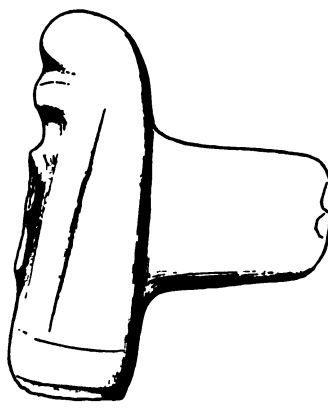
3



4



5



6

MONOLITHIC AXES FROM SANTO DOMINGO

of George J. Gibbs. It has also been figured by Cundall.¹ Our drawing (pl. II, 4) is from a photograph kindly furnished by Lady Blake. The handle is of *lignum-vitæ*, 23 inches in length. Cundall writes that "it was found in a cave at a village in Middle Caicos, under some five feet of cave earth, and was broken by the labourer in digging it out. The accumulation of the cave earth is of very slow growth, and possibly the hatchet is several hundreds of years old, especially when we remember that the native Indians were all removed by the Spaniards soon after their discovery of these islands." It will be noted that the end of the handle, where the stone blade is inserted in a mortise, is larger than the shank, which ends in a knob. This feature is present also in the monolithic axe of the Lady Blake collection. Another interesting feature is the projection of the pointed end of the blade through the handle, as is the case of all the monolithic axes shown on plates II to IV, with the single exception noted elsewhere.

In 1903 Dr Fewkes obtained the axes shown in plate III, 1, 2, 3; they were purchased from Archbishop Meriño of Santo Domingo, and are now in the United States National Museum.² No. 1 is different from any other in the series here described, in that the entire handle is curved in crescentic fashion, the cutting edge of the blade being in the inner curve. This axe is $9\frac{1}{4}$ inches long. No. 2 is almost cruciform and is $7\frac{3}{4}$ inches in length. No. 3 is 9 inches long and in form resembles closely the Providenciales and Cuban monolithic axes. These three examples from Santo Domingo have also been figured by Hamy.

The two monolithic axes shown in plate III, 4, 5, belong to a distinct type. They are now in Paris and have been made known to us by Dr Hamy.³ Both were found near Santo Tomás de Janico, in the province of Santiago, Santo Domingo, almost in the

¹ Cundall, op. cit., p. 68, fig. 10.

² Dr Fewkes has illustrated these axes in his "Preliminary Report on an Archaeological Trip to the West Indies," *Smithsonian Miscellaneous Collections (Quarterly Issue)*, vol. 45, 1903, p. 117, pl. XXXIX; also in his more extended monograph, "The Aborigines of Porto Rico and Neighboring Islands," *Twenty-fifth Annual Report, Bureau of American Ethnology*, pl. XIV.

³ Hamy, op. cit., figs. 5 and 6, pp. 7-8.

middle of the island. No. 4 measures 9 inches in length, while No. 5 is but 6 inches long. Each of these two specimens is characterized by the presence of the sculptured head of a monkey at the top of the handle, and they are the only examples of this type that have been found in the West Indies.

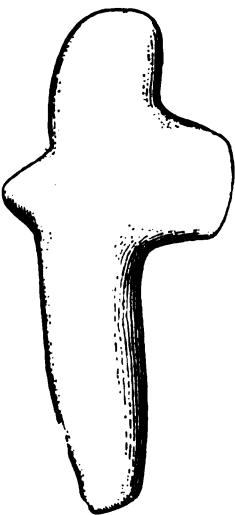
The last axe shown in plate III (fig. 6) is also from Santo Domingo, and was collected at Andrés, not far eastward from the city of Santo Domingo on the southern coast of the island. This specimen, which is now in the Museum of the American Indian, is broken, the greater part of the handle and the pointed projecting end of the celt being missing. It is, however, the most perfectly finished axe of this class that has yet been found in the Antilles. The fragment is $5\frac{3}{8}$ inches high, and, judging from the proportions of the complete examples in our series, the axe when entire must have been at least 12 inches long, and therefore one of the three largest monolithic axes from the islands. The upper end of the handle is slightly curved, and has two grooves on the side through which the end of the celt is represented as protruding. A further attempt at ornamentation is seen in the lines over the part of the handle at the junction of the celt.

A single example of monolithic axe has been discovered in Cuba (pl. IV, 1), and has been figured by Montane in his paper "L'Homme de Sancti Spiritus."¹ Although the locality is not given, it is probably from the eastern part of the island. This axe is $7\frac{3}{8}$ inches long, and is rudely shaped, presenting no points of special interest. It follows somewhat closely the lines of axes of this type from the Antilles, and may be compared with the axe from Providenciales (pl. II, 1) as well as one from Santo Domingo (pl. III, 3).

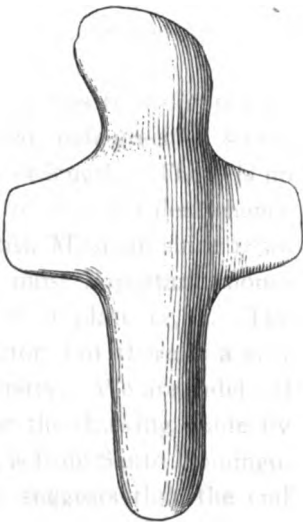
In his treatise on monolithic axes from the Antilles, Dr Hamy figures the specimen shown in our plate IV, no. 2, which is now in the Musée Cinquantenaire, Brussels.² It is 8 inches long and is analogous to many of the West Indian specimens, but its prove-

¹ Montane's paper appears in *Compte-rendu du XIII^e Congrès International d'Anthropologie et d'Archéologie préhistoriques*, Session de Monaco, 1908.

² Hamy, op. cit., fig. 7, p. 9.



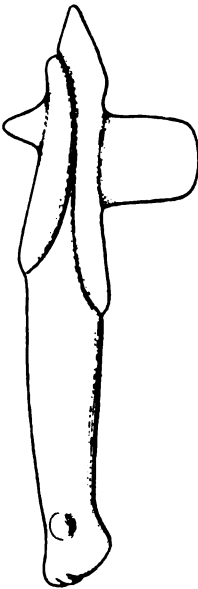
1



2



3



4

MONOLITHIC AXES FROM THE WEST INDIES

niance is not known. So far as can be judged from the drawing presented by Hamy, the unique feature of this axe appears to be the double-edge character of the blade.

The remarkable axe shown in plate IV, 3, has been figured by Joyce.¹ It is carved from solid, fine-grained, pale-greenish stone, is well polished, and measures $12\frac{7}{8}$ inches in length. There is no definite information respecting the island of the Antilles whence it was brought, but it has been in the British Museum since 1830.

The largest and in most respects the most important monolithic axe from the West Indies is figured in plate IV, 4. The original is in possession of a private collector, but there is a cast in the Peabody Museum of Harvard University. We are indebted to the Director, Mr C. C. Willoughby, for the drawing made by him for illustration in this series. This axe is from Santo Domingo, and is $14\frac{3}{8}$ inches long. Mr Willoughby suggests that the end of the handle may represent the head of a manati. In its upper section the specimen reminds us of the axe in the British Museum. An important feature to be noted is the placing of the petaloid butt-end of the blade out of alignment with the blade itself, a peculiarity observable also in both the Cuban and the British Museum examples illustrated in plate IV. In all the other monolithic axes from the West Indies, and indeed in all the axes in our series in which the end of the blade is represented as projecting through the handle at all, the axe is represented as if continuing through naturally, as in the case of the one with the wooden handle from the Bahamas shown in plate II, 4.

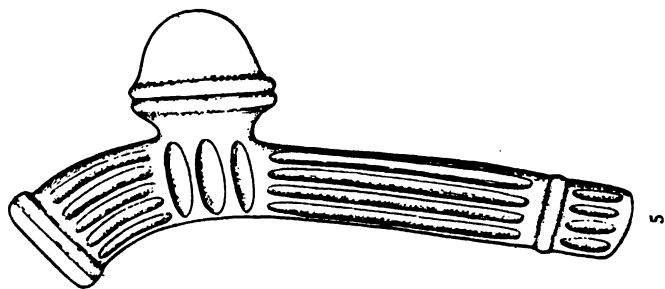
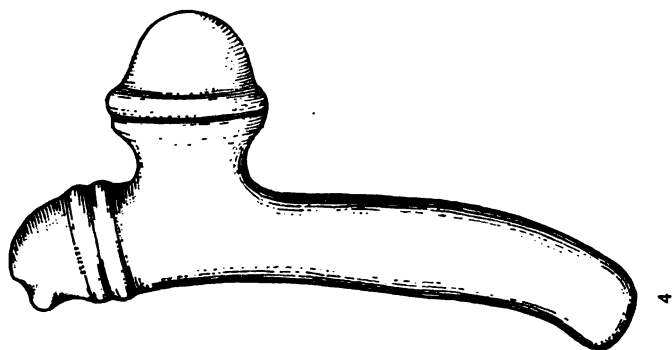
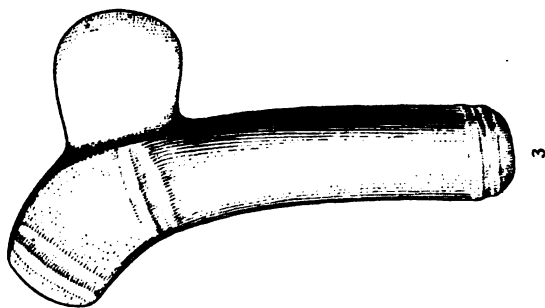
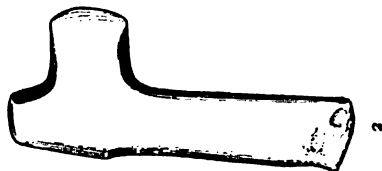
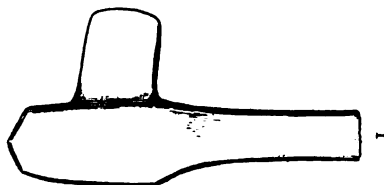
The two examples of monolithic axes from South America are in the American Museum of Natural History. They are illustrated in plate V, 1 and 2, and are among the smallest of the entire series. Figure 1 lacks the end of the handle and is now 5 inches long; figure 2 is $6\frac{5}{8}$ inches in length. These are both of argillite and were found together in a grave near Rio Don Diego, Province of Santa Marta, Colombia, near the coast between the

¹ T. A. Joyce, "Prehistoric Antiquities from the Antilles in the British Museum," *Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 1907, XXXVII, p. 418, pl. LIV, fig. 8.

cities of Santa Marta and Rio Hacha. These specimens are the only monolithic axes from South America that we have been able to trace, and belong to a class thus far known only in this particular region. The ends of the axe blades do not extend through the handle as in all the other specimens thus far described in this paper. A distinctive feature is the almost flat handle and the slight broadening at the junction with the blade.

We will now present three examples of monolithic axes from Central America that have not hitherto been described or illustrated. Plate v, 3, formerly in the Joseph Jones collection, is now in the Museum of the American Indian. The only history of the specimen is a note in the original catalogue by Dr Jones to the effect that it came from Honduras. Inasmuch as Dr Jones, living in New Orleans until his death, was in close touch with Honduras through the frequent arrival of steamers engaged in the fruit trade from Puerto Cortéz, he acquired a number of valuable specimens from that republic. The axe in question is carved from a heavy, compact, brownish-green stone; it is $9\frac{1}{8}$ inches long, and the unique rounded handle averages $1\frac{7}{8}$ inches in diameter. The particular features of this axe are its high polish, the curved handle, the two transverse grooves at and above the blade and the groove around the base of the handle. The blade is not represented as projecting through the handle, but, judging from its shape, the petaloid type of blade was doubtless intended to be imitated.

The two monolithic axes illustrated in plate v, 4, 5, have just come to our attention. Both are from Bluefields, Nicaragua, and have only recently been added to the collections in which they are now exhibited. No. 4 is in the United States National Museum, and we are indebted to Professor Holmes for the drawing and a note concerning it. This axe is of indurated volcanic tufa and is 12 inches long; it was collected by J. O. Thomas, of Bluefields, who obtained it from a Mosquito Indian chief in eastern Nicaragua. The blade, which is unlike any other in the series, with the exception of that of the axe shown in figure 5 of the same plate, reminds us somewhat of certain axes from the Lesser Antilles and northern South America. As in the specimen from Honduras (pl. v, 3), the handle is rounded and curved, but, unlike it, the curvature is at



MONOLITHIC AXES FROM COLOMBIA, HONDURAS, AND NICARAGUA

the base and not at the upper or blade end. Around the upper part are two bands, possibly designed to represent binding. There is also a band or ridge around the middle of the blade.

The last figure of the plate (no. 5) shows one of the most remarkable axes of the entire series. Mr C. C. Willoughby has kindly furnished us a drawing of the specimen, which is in the Peabody Museum of Harvard University. This axe, which measures $12\frac{1}{2}$ inches in length, was found in an excavation made for the foundation of a building at Bluefields. The blade is practically identical with that of the axe shown in figure 4. The rounded handle is decorated with three series of longitudinal grooves and with three transverse oval depressions over the section adjacent to the blade; above this point the handle is highly recurved. Apart from the more elaborate finish, this axe in its general features is identical with the other axe from the Mosquito shore, and the stone of which it is made is similar to that of the Honduras specimen. The three Central American axes are alike in not having the blade represented as projecting through the handle, but, as has been demonstrated, they represent two distinct types of blades.

Not originally included in our study of monolithic axes of the single-blade type are several examples of an entirely distinct variety in that they are characterized by a double blade (pl. VI). Although these do not belong to the series which we have considered, it has been thought desirable to place them on record in this paper. They are all from Nicaragua.

The example which thus far has served as a type is the beautifully shaped specimen shown in figure 1. It was discovered by Frederick Boyle in 1816, and figured by him in his work, *A Ride Across a Continent*.¹ The illustration has been copied by Bancroft² and others. Boyle evidently saw several axes of this kind, but so far as determined he obtained only the specimen here figured. He writes: "A double-bladed axe was offered us for sale in Libertad, which for beauty of workmanship and regularity of design might be compared with the best of European specimens." The specimen under consideration, he writes, "was found in a Chontal grave,"

¹ Frederick Boyle, *A Ride Across a Continent*, vol. II, p. 144, fig. 1.

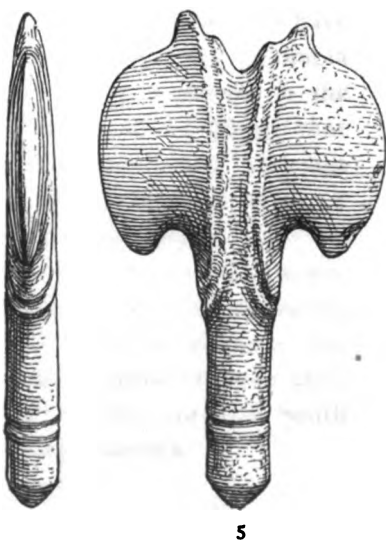
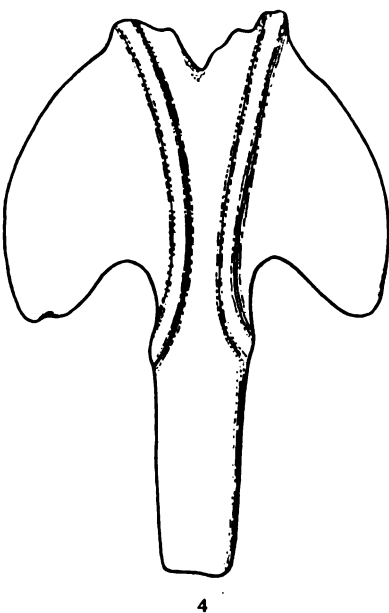
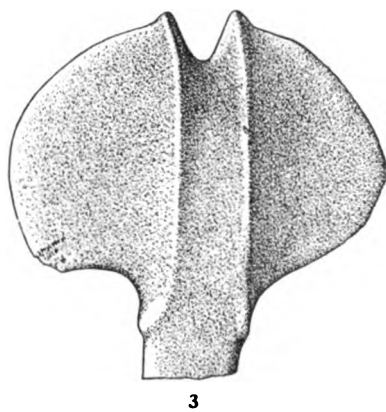
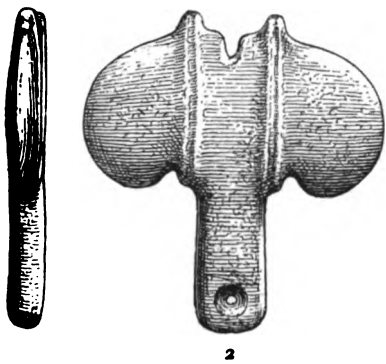
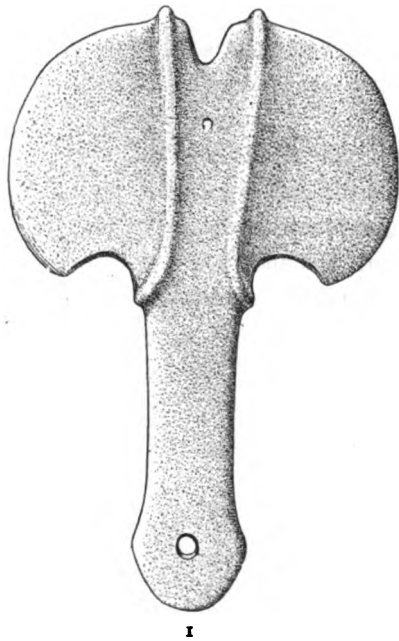
² H. H. Bancroft, *Native Races of the Pacific States*, vol. IV, "Antiquities," p. 59.

and he further states that it is in the British Museum. Through the kindness of Mr T. A. Joyce we are enabled to present a new drawing from a photograph of the specimen, which seemingly is of volcanic stone and measures $17\frac{3}{4}$ inches long by $12\frac{1}{4}$ inches in width across the blades. The end of the handle is perforated. The old settlement of the Chontales is in the mountainous region between Lake Nicaragua and the headwaters of the Rio Carca, which discharges into the Caribbean sea near the present town of Bluefields. This territory is now designated as the Department of Chontales.

Through the courtesy of Professor Holmes we are enabled to illustrate two interesting double-blade axes (pl. VI, 2, 5) recently acquired by the United States National Museum. They are both fashioned from an igneous rock, possibly diorite. The axe shown in figure 2 is $8\frac{1}{4}$ inches long by $7\frac{5}{8}$ inches across the blades, and, like that illustrated in figure 1, is perforated through the end of the flat handle. Figure 5 is of a slightly different form, being of greater length ($10\frac{5}{8}$ inches), and narrower across the blades ($6\frac{1}{4}$ inches). The handle, too, is rounded, and has a conical end. These two axes were obtained from a Mosquito chief in eastern Nicaragua by the late J. O. Thomas, of Bluefields.

The end of the handle of the axe shown in figure 3 is missing, and the right blade is irregular, in which respect it differs from the others shown in plate VI. This specimen is in the American Museum of Natural History, to which it was presented by Mr A. D. Strauss with a collection of Nicaragua pottery.

This study has brought out several clearly defined types of monolithic axes from different culture areas. The large axes from southeastern United States are all of the same general form, characterized chiefly by the attempt on the part of their makers to represent the poll of the axe as projecting through the handle. In all examples of this type the pointed end is cut off, resulting in the well-known celt form so widely distributed in the United States. Furthermore, three of the five examples of polished axes of this class are perforated at the end of the handle, while another of the series shows the end cut in such fashion as to indicate the



DOUBLE-BLADED MONOLITHIC AXES FROM NICARAGUA

possibility of similar treatment having been suspended before completion. Hence these two features seem to distinguish the axes from this region.

The blades of all the axes from the Antilles are represented as protruding through the handle, and with a single exception the poll is pointed, thus preserving the character of the petaloid celt so common throughout the Antilles. In the axes from this culture area there is greater variation in size and form than is found in those from the adjacent mainland of the United States.

The two axes from Colombia fall into another class, being rather small, while the poll of the blade appears as if imbedded in the handle rather than projected through, as in the Antillean specimens.

Finally, there are the three types from the Mosquito coast region of Nicaragua and Honduras, characterized respectively by the curved handle, the peculiar "imbedded" blade, and the double blade. The blade of the second of these Central American types seems to be foreign to this region, as to our knowledge no isolated blades of this kind have been found in Central America.

In assembling the data pertaining to the subject of this paper, we have examined the great collections of stone axes from various parts of North and South America and have consulted various persons concerning the distribution of true monolithic axes. It seems safe to state that in South America no monolithic axes have thus far been found, with the exception of the two from Colombia above described. When our attention was first drawn to the distribution of this form of axe, we believed with Dr Hamy that it might be possible to follow the line of distribution and "attempt to establish the landmarks of some route followed from the continent [South America] to the Antillean islands in far-distant times by an ancient race."¹ In view of the widely different types of monolithic axes, and the great gaps in a possible land and water migration route where they are not found, we feel forced to abandon this theory as untenable and to leave the matter undetermined until we know more of the archeology of the Antilles, northern South America, and the Caribbean coast of Central America.

¹ Hamy, *op. cit.*, p. 11.

CONTRIBUTIONS FROM
THE MUSEUM OF THE AMERICAN INDIAN
HEYE FOUNDATION

Volume III

PHYSICAL ANTHROPOLOGY OF THE
LENAPE OR DELAWARES, AND OF
THE EASTERN INDIANS
IN GENERAL

BY

ALEŠ HRDLIČKA

NEW YORK
THE MUSEUM OF THE AMERICAN INDIAN
HEYE FOUNDATION

10 EAST THIRTY-THIRD STREET

1916

NOTE.

This memoir, published in the series of Bulletins of the Bureau of American Ethnology, is based largely on a collection of skeletal remains recovered by an expedition of the Museum of the American Indian in the summer of 1914 in a cemetery associated with the site of an historic Munsee settlement near Montague, in the Delaware valley, northwestern New Jersey. These skeletal remains were presented to the United States National Museum by the Museum of the American Indian and therefore formed the basis of the study by Dr. Hrdlička, the results of which are herein presented. The archeological observations conducted at the Munsee site are incorporated in a paper bearing the title "Exploration of a Munsee Cemetery near Montague, New Jersey," by George G. Heye and George H. Pepper, which forms Volume II, No. 1, of *Contributions from the Museum of the American Indian*, to which the present memoir may be regarded as supplementary.

SMITHSONIAN INSTITUTION
BUREAU OF AMERICAN ETHNOLOGY
BULLETIN 62

PHYSICAL ANTHROPOLOGY OF THE LENAPE
OR DELAWARES, AND OF THE EASTERN
INDIANS IN GENERAL

BY

ALEŠ HRDLÍČKA



WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

LETTER OF TRANSMITTAL

WASHINGTON, D. C., *November 10, 1915.*

SIR: I have the honor to transmit herewith a report by Dr. Aleš Hrdlička on "Physical Anthropology of the Lenape or Delawares, and of the Eastern Indians in General," and to recommend its publication as a bulletin of the Bureau of American Ethnology.

Very respectfully,

F. W. HODGE,
Ethnologist-in-Charge.

HON. CHARLES D. WALCOTT,
Secretary, Smithsonian Institution.

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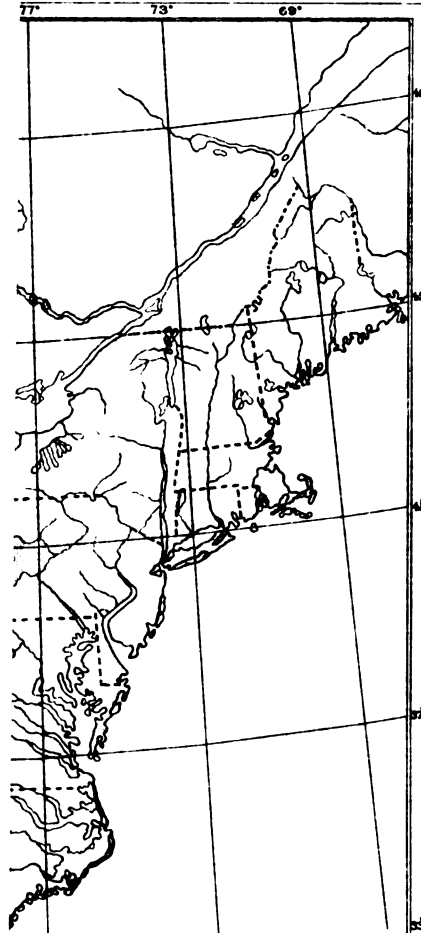
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**ANTHROPOLOGICAL MAP
OF THE
INDIAN POPULATION OF
EASTERN UNITED STATES
AND CANADA**

ACCORDING TO PRESENT KNOWLEDGE

BY ALEŠ HRDLIČKA

1915



**THE ALGONQUIAN-IROQUOIS
DOLICHOCEPHALIC TYPE**



**THE EASTERN AND
SOUTHERN BRACHYCEPHALS**

A. Hoen's Co. Baltimore

PHYSICAL ANTHROPOLOGY OF THE LENAPE OR DELAWARES, AND OF THE EAST- ERN INDIANS IN GENERAL

I. SKELETAL REMAINS OF THE MUNSEE

INTRODUCTION

IN 1902, in pursuance of a study of the antiquity of certain skeletal remains found in the vicinity of Trenton, New Jersey, the writer collected and described all the crania of the Lenape or Delaware Indians which at that time were preserved in our museums.¹ From that time until 1914 no further anthropological discoveries of consequence were made in the region over which the tribe once extended; but during the spring of the latter year careful archeological exploration was conducted in the upper Delaware River valley in behalf of the Museum of the American Indian in New York, by Mr. George G. Heye, with the assistance of Mr. George H. Pepper, in the course of which were found the remains of no fewer than 57 Indian skeletons.² The bones were not in the best state of preservation, but they were collected with scrupulous care, and shortly after the field work was completed they were presented by Mr. Heye to the United States National Museum. This skeletal material forms an important addition to the previously limited collections representing the Lenape Indians, whose physical identity it is highly desirable to establish.

The remains came from a cemetery in the form of a low mound on the New Jersey side of the Delaware River, opposite Minisink Island, 3 miles below Montague, in the northwestern corner of Sussex County, New Jersey. The accompanying map (fig. 1) shows the site of the cemetery, which lay in the heart of the region once occupied by the Munsee branch of the Lenape Indians.

¹ Hrdlička, The Crania of Trenton, New Jersey, and their Bearing upon the Antiquity of Man in that Region, *Bull. Amer. Museum of Natural History*, xvi, art. 311, New York, 1902, pp. 23-62, 22 pl., 4 fig.

² For details and archeological results, see George G. Heye and George H. Pepper, Exploration of a Munsee Cemetery near Montague, New Jersey, *Contributions from the Museum of the American Indian (Heye Foundation)*, II, pt. 1, New York, 1915. The Heye Expedition reports some additional burials, but the skeletal remains therefrom were in a very defective condition.

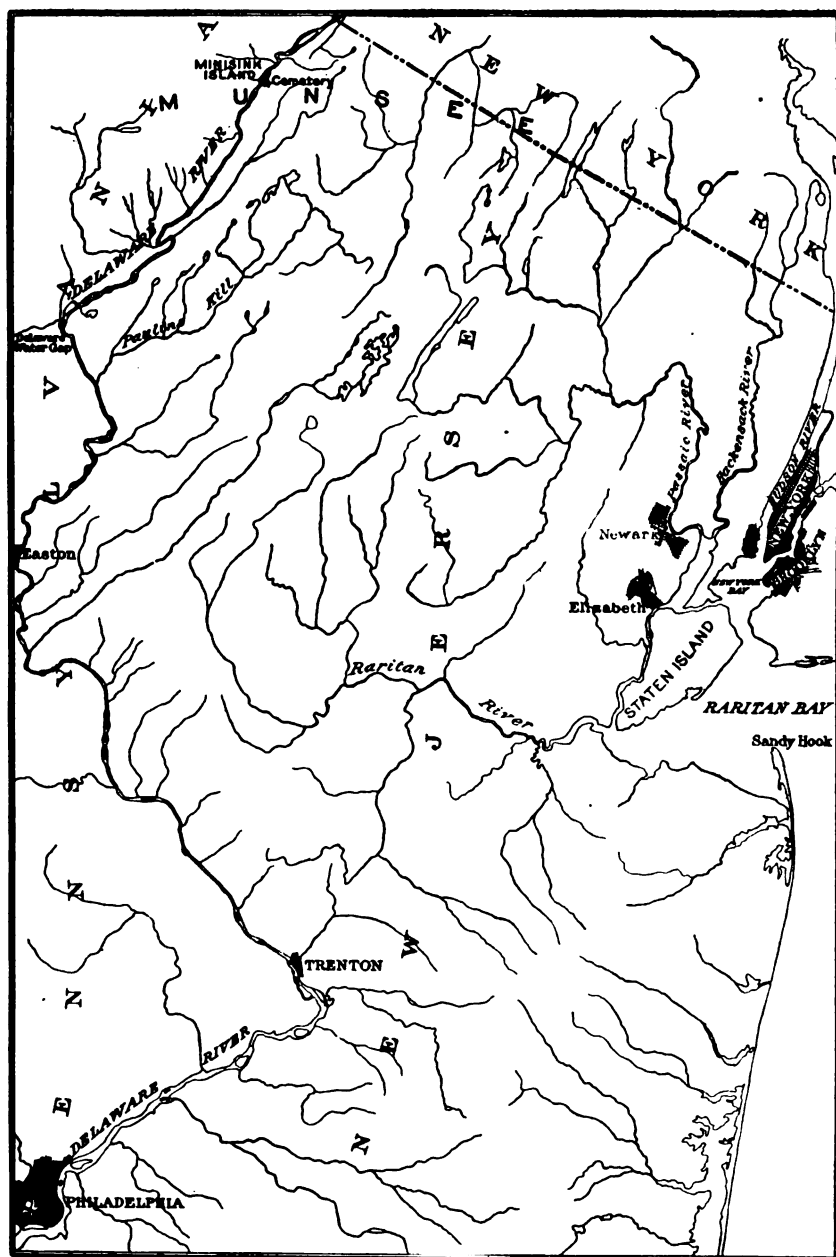


FIG. 1.—Map showing the location of the Munsee cemetery.

On the arrival of white settlers, the entire region afterward known as New Jersey belonged to the Lenape or Delawares,¹ whose settlements extended "from the Mohicannituck [Hudson River] to beyond the Potomac," and "from the heads of the great rivers 'Susquehannah' and 'Delaware' to the Atlantic Ocean" (Heckewelder). The neighboring tribes to the north (Mohegan, Narraganset, Pequot, and others), as well as those on the south (Nanticoke, the Powhatan confederacy, and others), all acknowledged relationship with the Delawares, with whom, there is no doubt, they were affiliated linguistically.

The Lenape were divided into three large groups, or, as Brinton calls them, "sub-tribes," namely, the Munsee or Minsi (the Wolf), the Unami (the Turtle), and the Unalachtigo (the Turkey).² These subtribes, it seems, were subdivided into numerous smaller groups with distinctive names.³ The three branches of the tribe occupied special regions, but it has not been reported whether their boundaries were stable and definite. The Minsi, according to Heckewelder,⁴

¹ Captain John Smith's Works, 1608-1631, Arber ed., Birmingham, 1884; William Penn's Letters, 1683; G. Thomas, *History of New Jersey*, London, 1698; Thomas Campanius Holm, *Short Description of New Sweden*, Stockholm, 1702, transl. by Duponceau in *Memoirs of the Historical Society of Pennsylvania*, III, Phila., 1834; T. Acrelius, *History of New Sweden*, Stockholm, 1759, transl. in *Memoirs of the Historical Society of Pennsylvania*, XI, 1874; Samuel Smith, *History of the Colony of Nova Cesarea or New Jersey*, Burlington, 1765; Peter Kalm, *Travels into North America*, London, 1770-71; G. H. Loakiel, *History of the Mission of the United Brethren among the Indians in North America*, London, 1794; Geo. Chalmers, *Political Annals of the Present United Colonies*, etc., 1780, *New York Historical Society Collections*, 1868; John G. E. Heckewelder, *History, Manners and Customs of the Indian Nations who once Inhabited Pennsylvania and the Neighboring States*, Phila., 1819, *Mem. Hist. Soc. Penn.*, XII, 1876; also MSS.; James Grahame, *History of the Rise and Progress of the United States of North America*, London, 1827 (new ed., 1836, 1845); Thos. F. Gordon, *History of New Jersey*, Trenton, 1834; J. Curt's Clay, *Annals of the Swedes on the Delaware*, Phila., 1835; Yates and Moulton, *New York*, N. Y., 1824; Isaac Mickle, *Reminiscences of Old Gloucester*, Phila., 1845, Camden, 1877; A. Gifford, *Aborigines of New Jersey*, *Proc. N. J. Hist. Soc.*, IV, Newark, 1889, pp. 163-198; D. G. Brinton, *The Lenape and their Legends*, Phila., 1885; *Handbook of American Indians*, Bull. 30, Bureau of American Ethnology, Washington, 1907-1910.

² These designations are not translations of the terms given in parentheses, but "refer to the location of these sub-tribes on the Delaware River," Minsi (from *minshin*, to be scattered, and *achsin*, stone), meaning "people of the stony country" or "mountaineers"; Unami (from *naken*, down-stream) means "people down the river"; and *Unalachtigo* (from *wunalawat*, to go towards, and *t'kow* or *t'kou*, wave) means "people who live near the ocean." Wolf, Turtle, and Turkey are the totemic designations of the three sub-tribes. (Brinton, op. cit., p. 34.)

³ From the above tribes, in course of time, sprang many others "who, having for their own convenience, chosen distant spots to settle on, and increasing in numbers, gave themselves names or received them from others." (Heckewelder, *Hist. Indian Nations*, p. 53; see also *ibid.*, p. 51.)

⁴ Heckewelder, *Hist. Ind. Nations*, p. 52. Brinton (op. cit., p. 37) is of the opinion, but on what grounds is not stated, that the extent of the territory of the Munsee as given here is too great. In his words, "that at any time, as Heckewelder asserts, their [the Munsee] territory extended up to the Hudson as far as tide-water, and westward 'far beyond the Susquehannah' is surely incorrect. Only after the beginning of the eighteenth century, when they had been long subject to the Iroquois, have we any historic evidence that they had a settlement on the last named river." It seems, however, that even if the presence of the Munsee on or beyond the Susquehannah may be open to contention, their presence along the Hudson is well established. Gifford (*Aborigines of New Jersey*, p. 180) states that "the Minsi tribe extended as far on the west banks of the Hudson as Tappan." Yates and Moulton (*History of New York*, I, p. 225) place the Minsi even farther east, "from Long Island to and beyond Minisink." According to Ruttenber (*History of the Indian Tribes of Hudson's River*, p. 50) the Munsee territory "extended from the Catskill mountains to the headwaters of the Delaware and Susquehanna rivers, and was bounded on the east by the Hudson; their council-fire was lighted at Minisink [about 10 miles south of Maghacmek, New Jersey]." The Unami joined the Munsee on the south, somewhere about Stony Point. Going farther than this, Ruttenber gives (p. 93 et seq.) the various subdivisions of the Munsee along the Hudson and their location: the Waoroneck, about Dans-kammer; the Warranawongkong, from Dans-kammer to Saugerties; the Mamekoting west of Shawangunk mountains; the Wawarsink, in the district which still bears their name; the Catskills, north of Saugerties.

had "chosen to live back of the two other tribes and formed a kind of a bulwark for their protection. . . . They extended their settlements from the Minnisink, a place named after them, where they had their council seat and fire, quite up to the Hudson on the east, and to the west or southwest far beyond the 'Susquehannah'; their northern boundaries were supposed originally to be the heads of the great rivers Susquehannah and Delaware, and their southern boundaries that ridge of hills known in New Jersey by the name of Muscanecon, and in Pennsylvania, by those of Lehigh, Cohnewago, etc."¹

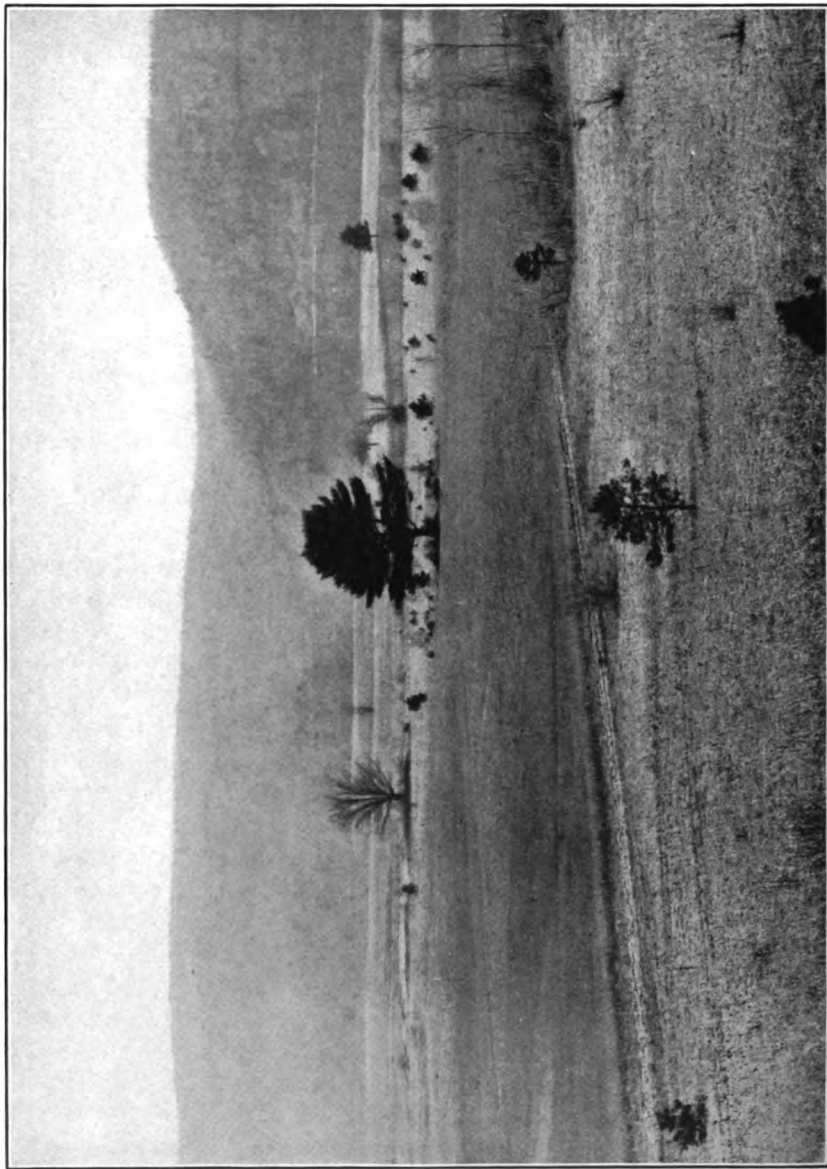
This is evidently one of the rare instances in which it is possible to make a clear tribal identification of older skeletal remains in eastern North America, and it is also an instance in which the contents of graves enable a fairly close estimate of the age of the site. The artifacts found with the various burials include a number of objects introduced by early settlers, a fact that shows the cemetery to be of historic date. Furthermore, one of the skeletons is that of a tall white man of Scandinavian or Nordic type, possibly one of the Dutch, English, or Swedes who reached the upper valley after 1614. As the remainder of the skeletons do not indicate any trace of admixture of white blood, the cemetery may be regarded as dating from the period of the earlier contact of the Indian and Caucasian races, or probably from the latter part of the seventeenth or the beginning of the eighteenth century. It was surely earlier than 1740, for in that year the main body of the Munsee was forced to move from the Delaware, settling first on the Susquehanna and soon after on the Allegheny River in Pennsylvania, where some of them had gone as early as 1724.

An event of anthropological importance in connection with the Munsee before their removal from the Delaware is noted by Ruttenber.² In the latter part of the seventeenth century, at the outbreak of hostilities between the Five Nations and the French, the advance of the Iroquois in the south was being contested by the Shawnee, who at that time were also engaged in war with the Cherokee. "In the latter they [the Shawnee] suffered severely, and but for the timely aid of the *Mahicans* would have been destroyed. The *Lenapes* [Delawares] invited them to remove to their country; the invitation being accepted, the *Minsis* brought the matter to the attention of the government of New York, in September, 1692, on an application to permit their settlement in the Minnisink country. The council gave its assent on condition that they should first make peace with the Five Nations.³ This was soon effected, and the messengers departed, ac-

¹ Quoted from Hrdlička, *The Crania of Trenton*, op. cit., pp. 32-33.

² Ruttenber, *History of the Indian Tribes of Hudson's River*, p. 178.

³ "River Indians returned from a residence with the Shawanoes, brought with them some Shawanoes



GENERAL VIEW OF THE LOCALITY OF THE MUNSEE CEMETERY AT MINISINK, NEW JERSEY

accompanied by Arnout Vielle, an interpreter, and three Christians, to visit the country of the *Shawanoes* and consummate the transfer. . . . Captain Arent Schuyler visited the *Minnisinks* in February, and there learned that the Shawanoes were expected early in the ensuing summer. This expectation was realized."

From this it appears that between 40 and 50 years before their removal from the Delaware, the Munsee were joined by some Shawnee, which fact may explain certain peculiar conditions shown by the skeletal remains that will be considered in the following pages.

The mound or cemetery explored by the Museum of the American Indian was known for many years, and some human bones had been removed from it, especially by Doctor Dalrymple, who exhumed at least 15 skeletons, but unfortunately these have been lost to science.

CONDITION OF THE COLLECTION

GENERAL

As already stated, the collection from the Museum of the American Indian consists of 57 Indian skeletons, which range from nearly complete to such as are represented by only a few bones. Notwithstanding the fact that the condition of the material leaves much to be desired, many of the bones are sufficiently well preserved to afford fairly good data for study. The bones show neither vestiges of greenness nor traces of mineralization. There is no post-mortem deformation, except in a few detached bones of the skulls of infants. The color of the bones is predominantly brownish yellow, shading in some specimens to light dirty yellowish and in others to a darker brownish hue.

AGE AND SEX

Of the 57 individuals, 34 were adults and 23 (40 per cent) were adolescents or children. Among the adults the estimated ages of the individuals range from 24 to 70 years, and nearly half were 50 years or more. Young infants (first year) and fetuses are absent, having either been buried separately, or, more likely, had turned to dust, while the older, more substantial bones resisted disintegration. The cemetery was obviously one that served during a limited period as the communal burial place of a sedentary group of moderate population. The determination of the sex was facilitated by the good development of the sexual characteristics in the skulls, and by the presence of the pelvic and other bones of the skeleton. The results

who intended to settle with the Minnisinks, asking permission to that end. Council directed that the Shawanoes must first make peace with the Five Nations.—*Council Minutes*, Sept. 14, 1692."

show that the 34 adults were divided equally between the sexes, as might be expected in the case of the remains of adults in the cemetery of a peaceful population.¹

ARTIFICIAL DEFORMATION

A fact of considerable interest is the presence of artificial deformation in more than half of all the skulls preserved. In the majority of cases this appears to be a simple occipital, cradle-board flattening, but there are three or four instances in which there are plain traces of bilateral frontal compression, which indicates intentional deformation and suggests that all the posteriorly flattened skulls may possibly be of this variety, though the applied pressure failed in most cases to leave a distinct mark on the frontal bone.² The result of no such practice has been observed in any other part of the northern or middle Atlantic States, but deformation of exactly this type was common in Arkansas and Louisiana, as well as in the area to the northeastward.³ Among the crania of the earlier and somewhat more easterly Lenape reported by the writer⁴ to the number of 25, only two (both females) showed slight occipital flattening. These facts are significant and point either to some difference in derivation between the Munsee and other Lenape and eastern Algonquian tribes, or, if of common derivation, to a connection between the Munsee and some people from the Trans-Appalachian region to the southwestward. It is in this connection that the historic accession to the Munsee of some Shawnee is suggestive, for the latter, or a part of them, lived in Kentucky and Tennessee, where the practice of fronto-occipital deformation was not uncommon, and in some parts of that area, indeed, was quite general.

PATHOLOGY

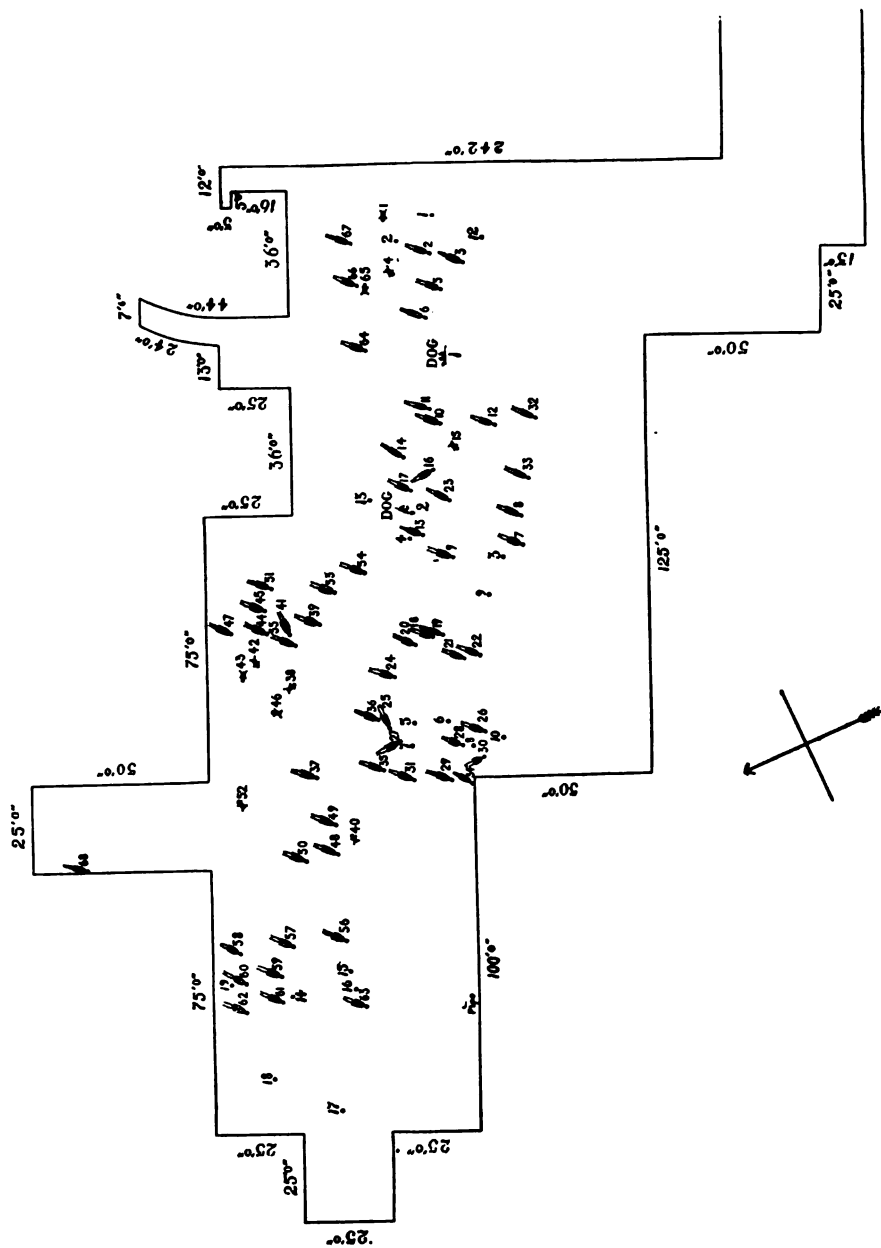
The bones in the collection are exceptionally free from the effects of injury and disease. The skulls exhibit no scars or injuries, and no disease, with the exception of a case of perforating mastoiditis in one of the children (no. 285,348). There is, however, as will be shown later, a considerable proportion of dental caries, with some indications of *pyorrhea alveolaris*.

¹ Had the cemetery, prior to its disturbance, contained the remains of as many as 200 bodies of all ages, including infants, with a yearly mortality in the tribe of 35 per thousand, it could have been in use only about 60 years by a population of 100, and proportionately less, of course, for a larger group.

² As happened frequently on the coast of Peru, for instance, where the same type of deformation was practiced. No board was used in these instances, the frontal compression being effected by means of pads.

³ Report on a Collection of Crania from Arkansas, *Journal of the Academy of Natural Sciences of Phila.*, xiii, 559-563, Phila., 1908; Report on an Additional Collection of Skeletal Remains from Arkansas and Louisiana, *ibid.*, xiv, 1909, pp. 173-240, 9 figs.; Report on Skeletal Remains from a Mound on Haley Place, near Red River, Miller County, Ark., *ibid.*, xiv, 1912, pp. 639-640; Report on a Collection of Crania and Bones from Sorrel Bayou, Iberville Parish, La., *ibid.*, xvi, 1913, pp. 95-100.

⁴ *The Crania of Trenton*, op. cit., 1902.



PLAN OF THE MUNSEE BURIAL SITE SHOWING LOCATION AND POSITION OF THE BURIALS

In the remaining bones of the skeletons the only marks of injury or disease are as follow:

Humeri (total number present, adults,¹ 56):

Left bone of no. 285,307: Old surface injury involving lower fourth of external border, with formation of some callus and a peculiar foramen (pl. 23).

Right bone of no. 285,303: Complete ankylosis with ulna, at right angle, possibly as a result of an early fracture of the olecranon (pl. 24).

Both humeri of no. 285,320: Some periostitis on distal third.

Both humeri of no. 285,306: Osteoperiostitis, distal half.

Radii (total number, adults, 45):

Both bones of no. 285,320: Some osteoperiostitis over distal half.

Ulnæ (total number, adults, 44):

Left bone of no. 285,306: Moderate osteoperiostitis, lower bone (right healthy).

Femora (total number, adults, 60):

Pair, no. 285,306: Moderate osteoperiostitis, distal half.

Right bone of no. 285,336: Some osteoperiostitis, distal half (left healthy).

Right bone of no. 285,320: Moderate osteoperiostitis, distal half (left healthy).

Right bone of no. 285,313: Marked "mushroom head" (arthritis deformans); left healthy.

Left bone of no. 285,321: Moderate "mushroom head."

Tibiæ (total number, adults, 58):

Right bone of no. 285,301: Trace of periostitis at middle (left healthy).

Right bone of no. 285,303: Slight osteoperiostitis on external surface, middle third (left healthy).

Right bone of no. 285,306: Osteoperiostitis, proximal half (left healthy).

Left bone of no. 285,313: Moderate localized osteoperiostitis, middle (right healthy).

Right bone of no. 285,336: Moderate osteoperiostitis, middle three-fifths (left healthy).

Left bone of no. 285,309: Trace of periostitis (right healthy).

Pair of no. 285,320: Osteoperiostitis.

Left bone of no. 285,321: Slight arthritis, upper articular surface (right healthy).

Fibulæ (number present, adults, 51):

Pair, no. 285,320: Osteoperiostitis.

¹ The bones of the children show nothing pathological.

Clavicles (present, 44):

Pair, no. 285,305: Moderate osteoperiostitis.

Right, no. 285,320: Osteoperiostitis.

Sternum (present, 14):

Moderate arthritic changes in nos. 285,305, 285,309, and 285,314.

Scapulæ (present, 25): Nothing pathological.*Ribs* (present, 420):

No. 285,305: Two long ribs fractured, well healed.

No. 285,309: One long rib fractured.

In addition, most of the ribs of nos. 285,305 and 285,333 show traces of arthritis.

Spine (of 25 individuals, mostly complete):

No. 285,305: Some marginal exostoses (arthritic) in the cervical and lumbar regions.

No. 285,306: Moderate arthritic exostoses, lumbar region.

No. 285,333: Advanced spondylitis deformans, involving parts of dorsal and whole lumbar region with sacrum, synostosis.

No. 285,319: Moderate arthritic exostoses on nearly all.

No. 285,311: Moderate arthritic exostoses.

No. 285,320: Moderate arthritic exostoses.

No. 285,328: Moderate arthritic exostoses in cervical and lumbar regions.

Pelvic bones (of 20 individuals):

No. 285,321, right: Some marks of arthritis about acetabulum.

Bones of the hand (number, 774):

No. 285,303: Carpal bones of right all damaged, crushed, and fused with third metacarpal.

No. 285,320: One of the carpals crushed in life.

Bones of the feet:

Os calcis (number, 61): Nothing pathological.

Astragalus (number, 58): Nothing pathological.

Other bones (number, 537):

No. 285,321: Right scaphoid, arthritis (left healthy).

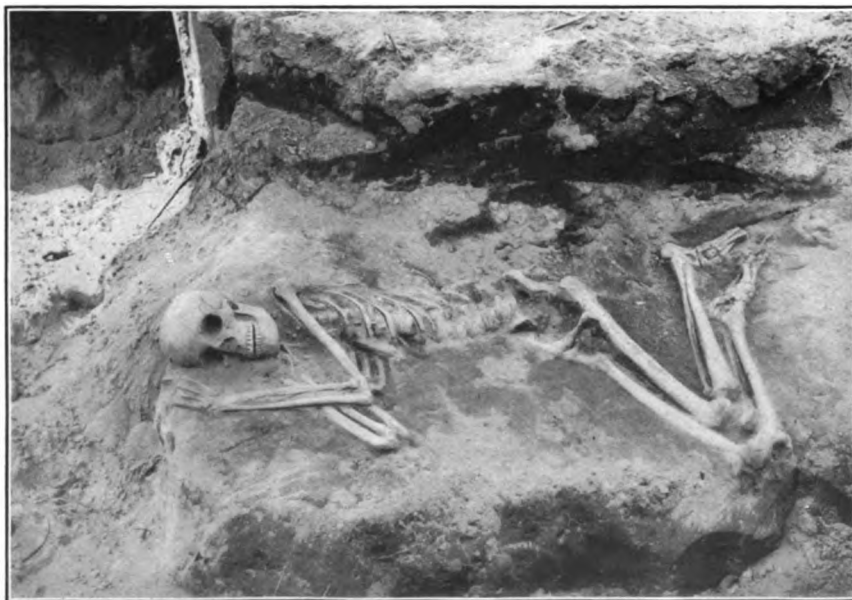
No. 285,326: First right metacarpal diminutive (may have been injured in early life).

Patellæ (number, 38):

Pair of no. 285,329: Slight arthritis.

A summary of the above details shows that there are only six, possibly seven, instances of more noteworthy injury, and of these three pertain to ribs (two in one person) and two to the wrist. These are very moderate proportions of traumatism, and show plainly that the people represented by the remains led unusually peaceful lives.

As to disease, there is evidence of only four conditions, namely: Periostitis, osteoperiostitis, arthritis, and arthritis deformans; and of



TWO TYPICAL MUNSEE BURIALS IN MODERATELY CONTRACTED POSITION

these four the first two and again the last two are closely related, being really only degrees or varieties of the same processes. It is quite possible that all four conditions are merely differing manifestations of arthritis. There is no well-founded suspicion of the existence of syphilis in the tribe, and there is no trace of either rachitis, tuberculosis, or tumors of the bones. (Dental caries will be referred to under Teeth.)

We may now approach the more strictly anthropological observations.

THE CRANIA

GENERAL OBSERVATIONS: DIFFERENCES IN TYPE

Although the remains comprise seventeen adult males and the same number of females, some of the skulls are so defective that measurements and notes of value could be made only on those of ten males and thirteen females.

In examining and arranging these specimens, the first realization of importance is that, while the majority clearly belong to one type, there are a few that must be classed apart. The main type, as will be noted later and more plainly from the measurements, is that characterized by dolichocephaly to mesocephaly, and agrees with that prevalent among other Lenape as well as other Eastern tribes. The additional type is brachycephalic. Among the twenty-five skulls of adults there are four of the brachycephalic type, all females. A few additional examples existed evidently among the children; and several of the remaining skulls may be transitional as a result of admixture. The brachycephaly is so marked that it can not be due to normal individual variation within the series, and if we exclude this possibility the only remaining conclusion is that the broad-heads could not have been Lenape, except by adoption. The individuals represented by these skulls might have come from western Pennsylvania, where brachycephaly seems to have prevailed at least in some districts; or from farther southwestward, from a region to which points the intentional deformation among the "Munsee" crania. These possibly represent the Shawnee, who came from that section and who, according to growing indications, while speaking Algonquian were of a different type physically.

The admixture of this type existed evidently also among other branches of the Lenape, and to a more limited extent among various other tribes of the Atlantic states. The writer called attention to this mixture in 1902,¹ and will return to the subject in the second part of this memoir, which deals with Eastern skulls in general.

¹ *Crania of Trenton*, op. cit.

CHIEF DESCRIPTIVE FEATURES

The skulls are of good size, but otherwise are characterized by moderate development. There is no massiveness, no heavy supra-orbital arches or crests, no heavy jaws. It is plain that they did not belong to a tribe of great huntsmen or warriors.

The frontal region, though prevalently somewhat low in the females, in a large majority of the cases is well arched; the zygomæ are not excessively broad, the malar bones not heavy. The nose is rather short, the face only mildly prognathic. The dental arches, as in the majority of Indians, are very regular, and the same applies to the medium-sized teeth. The vault of the skull from above is either ovoid (58 per cent) or elliptical (42 per cent), while the outline of the norma posterior approaches more or less the pentagonal.

In addition there may be mentioned an unusual scarcity of Wormian bones and an equal sparsity of marked anomalies. These and other features are treated in detail in another part of this paper. (See pp. 35, 47.)

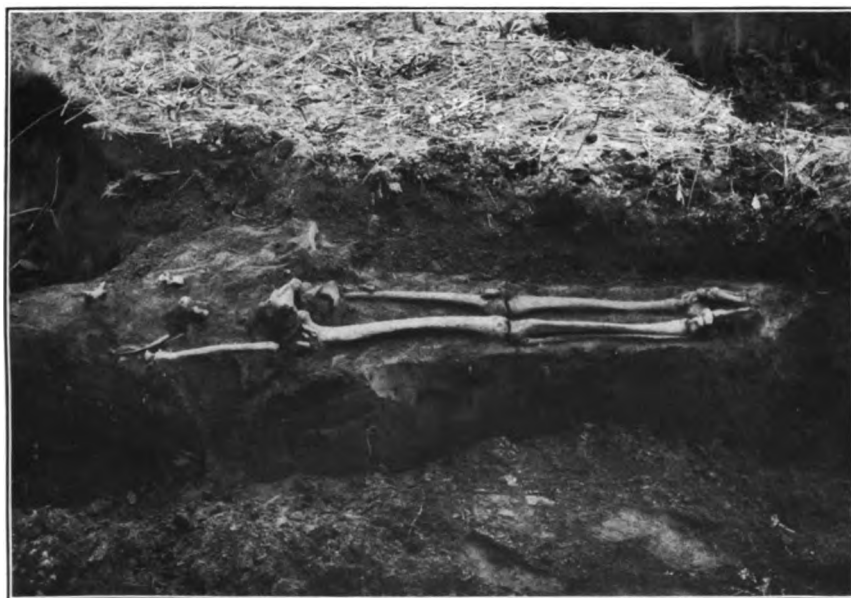
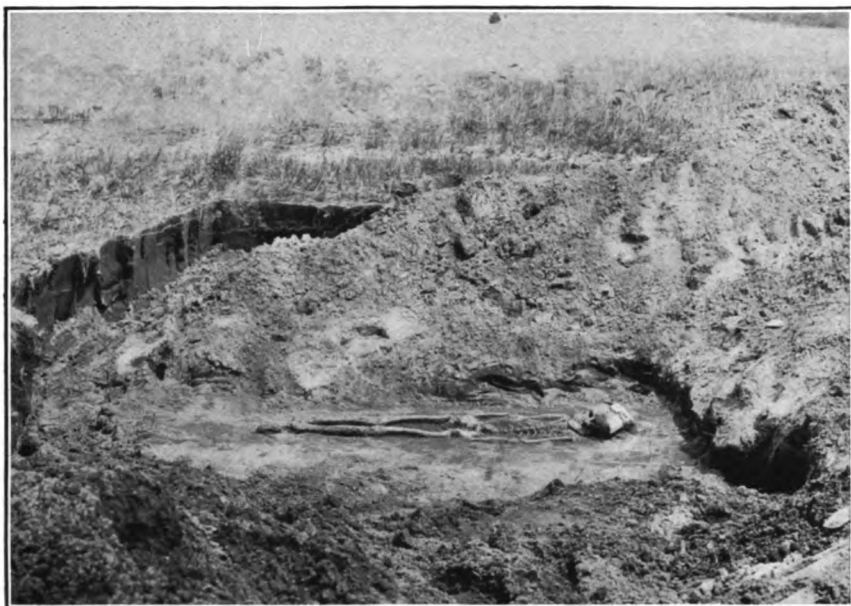
MEASUREMENTS

The measurements¹ offer many points of interest, although, so far as the vault is concerned, they are considerably interfered with by artificial deformation in some of the specimens. As in certain former reports by the writer, they will be dealt with in order according to their significance.

FORM OF THE VAULT

The measurements relating to the form of the vault comprise the maximum length and breadth, and the basion-bregma height, with the resultant percentage-relations or indexes. The details are given in the accompanying table. Although the number of undeformed specimens in good condition is small, it will be seen (*a*) that there is an absence of extremes in the several dimensions, (*b*) that the crania range in type from dolichocephalic to mesocephalic, and (*c*) that they show good height. As a result of the latter, both the height-length and the height-breadth indices are high, though corresponding well with those of many other Indian tribes and those of numerous other branches of the yellow-brown race. Comparisons will be found in the second part of this report, which deals with the Eastern Indians in general.

¹ All measurements presented in this report were taken personally by the writer, with proved instruments and due care. Unless otherwise noted, the methods follow strictly the international agreements of Monaco and Geneva.



TWO BURIALS IN EXTENDED POSITION

The lower burial is of special interest as showing how much of a skeleton may be decayed or scattered without disturbance of the remainder

I. MUNSEE CRANIA: MEASUREMENTS RELATING TO THE FORM OF THE VAULT*

MALES

Cat. No., U.S.N.M.	Deformation	Length, maxi- mum	Breadth, maxi- mum	Height (basion- bregma)	Cephalic index	Height- length index	Height- breadth index
		(a)	(b)	(c)	$\frac{b \times 100}{a}$	$\frac{c \times 100}{a}$	$\frac{c \times 100}{b}$
285,303.....	(Slight asymmetry).....	cm. 18.9	cm. 13.3	cm. 14.2	70.4	75.1	106.8
285,308.....	.....	19.8	14.6	13.8	73.7	69.7	94.5
285,306.....	.....	18.7	14	14	74.9	74.9	100.0
285,313.....	.....	18.8	14.4	13.7	76.6	72.9	95.1
285,326.....	Slight occipital flattening.....	(17.7)	(13.7)	(14.4)	.....	.....	.....
285,301.....	Moderate occipital flattening.....	(17.8)	(15.1)	(14.6)	.....	.....	.....
285,305.....	do.....	(17.0)	(14.6)	(13.7)	.....	.....	.....
	Averages of unde- formed.....	(4) 19.06	(4) 14.1	(4) 13.9	(4) 73.9	(4) 73.1	(4) 98.9

FEMALES

285,309.....	.....	18.2	13.3	13.1	73.1	72	98.5
285,327.....	.....	17.6	13.1	12.4	74.4	70.5	94.7
285,307.....	Trace of fronto-occipital flat- tening†.....	16.9	13	12.9	76.9	76.3	99.2
285,320.....	.....	17.4	13.4	13	77	74.7	97
285,347.....	.....	18	14	13	77.8	72.2	92.9
285,302.....	Moderate occipital flattening.....	(16.0)	(14.1)	(13.2)	.....	.....	.....
285,304.....	do.....	(16.6)	(14.3)	(14.2)	.....	.....	.....
285,310.....	do.....	(16.9)	(14.4)	(14.2)	.....	.....	.....
285,321.....	Marked occipital with slight frontal flattening.....	(16.4)	(14.5)	(14.2)	.....	.....	.....
	Averages of unde- formed.....	(5) 17.6	(5) 13.4	(5) 12.9	(5) 75.8	(5) 73.1	(5) 96.4

* Arranged on the basis of the cephalic index.

† Not sufficient to vitiate the measurements.

Attention may be called to the lower value of the average cephalic index and the higher value of the average height-breadth index in the males than in the females. These conditions, due to the relatively greater length and also to the relatively greater height of the male skull, are not exceptional and will later be found to be quite general among Eastern Indians.

The identical value of the average height-length index in the two sexes is of no special significance and is probably incidental.

In the deformed skulls we see the usual effect of the flattening by the lessening of the length and a compensatory increase in both breadth and height.

SIZE OF THE SKULL

The principal determinations relating to the size of the vault are the cranial module or mean diameter, the capacity, the circumference, and the antero-posterior arc, all of which are given in the next table, where also is shown the thickness of the skull, which is of importance as a corrective to the external dimensions.

II. MUNSEE CRANIA: MEASUREMENTS RELATING TO THE SIZE OF THE VAULT *

MALES

Number	Capacity †	Cranial Module L+B+H	Circum- ference maximum (above supra- orbital ridges)	Nasion- opisthion arc	Thickness of left parietal (1 cm. above and along squamous suture)
		3			
	c. c.	cm.	cm.	cm.	mm.
285,326.....	1,470	15.27	49.3	36.2	4
285,306.....	1,505	15.57	51.5	36.6	4.5
285,303.....	1,515	15.47	51.7	38.3	5.5
285,301.....	1,515	15.83	51	36.9	6.5
285,306.....	1,530	15.10	49.4	35.2	5.0
285,313.....	1,550	15.63	51.3	37.1	5.5
285,308.....	1,720	16.07	55	39.5	4
Averages.....	(7) 1,544	(7) 15.56	(7) 51.3	(7) 37.1	(7) 5

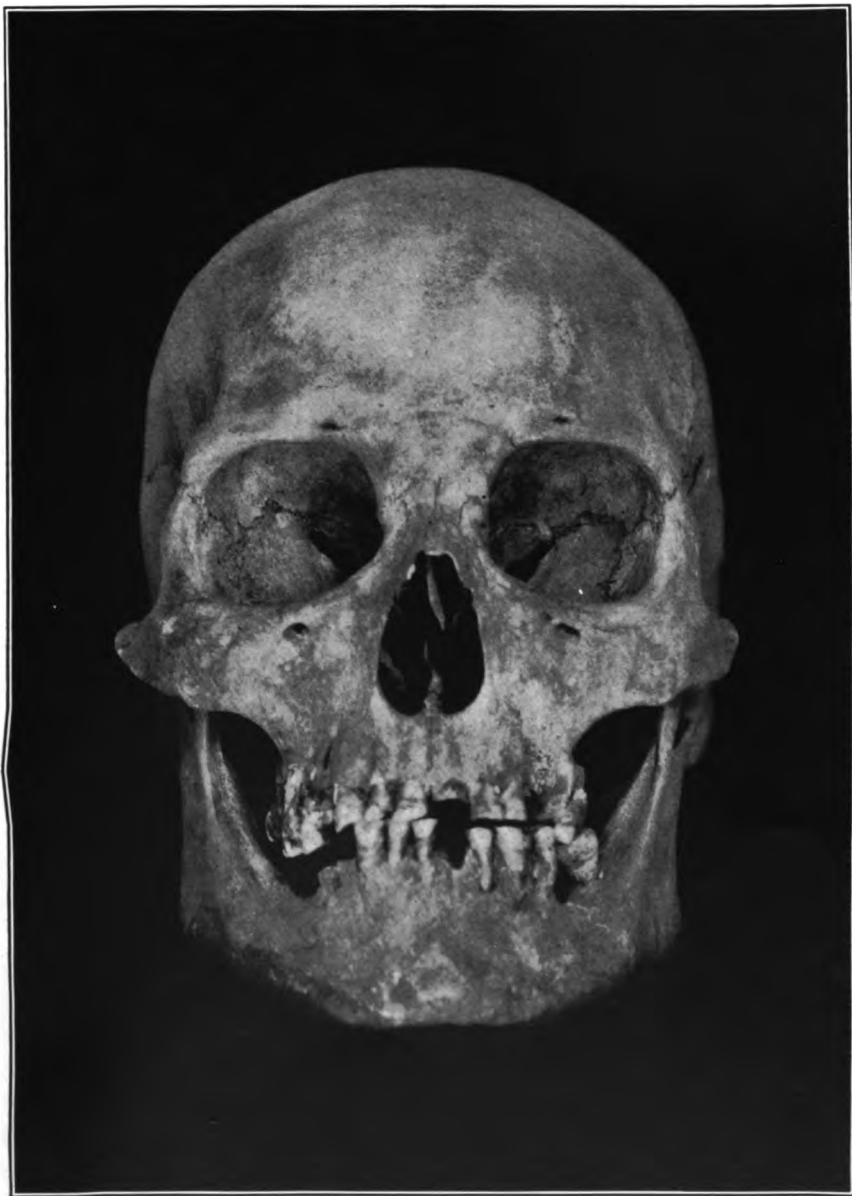
FEMALES

285,327.....	1,225	14.37	48.5	34.9	3.5
285,307.....	1,240	14.27	47.6	33.9	3.5
285,347.....	1,265	15.0	50.2	35.1	5.5
285,320.....	1,280	14.60	48.2	35.0	4.0
285,304.....	1,275	15.03	48.7	33.3	5.0
285,302.....	1,265	14.43	47.9	33.8	4.0
285,309.....	1,300	14.87	50.1	36.3	4.0
285,321.....	1,310	15.03	48.7	34.0	5.0
285,310.....	1,375	15.17	49.3	35.0	5.0
Averages.....	(9) 1,285	(9) 14.75	(9) 48.8	(9) 34.6	(9) 4.4

* Arranged on the basis of capacity.

† Measured with dry mustard-seed and by the writer's method described in *Science*, xvii, 1903, pp. 1011-1014.

It will be noted that the measurements of the Munsee skulls, particularly those of the males, show fair capacity as well as external size of the vault, and also that only a few of the crania are thick-walled. An interesting feature is the unusual superiority of the measurements of the males over those of the females. This in a measure is due to the occurrence among the males of one skull of extraordinary size (1,720 c. c.); but even if we exclude this, the difference between the two sexes is somewhat greater than among other Indians. In the following table are given a few comparative data on this point.



MALE MUNSEE SKULL, NO. 285,303, U.S.N.M. (FRONT VIEW)

III. RELATION OF AVERAGES OF MEASUREMENTS RELATING TO SIZE OF VAULT IN MALES AND FEMALES

(Males=100)

Group	Number of specimens		Capacity	Module	Circumference	Nasion-opisthion arc	Thickness
	Males	Females					
Arkansas*.....	19	14	86.5	96	96	96.5	92.5
Louisiana*.....	12	7	89.5	96	97	98	88
Munsee (excepting no. 285,308)...	6	9	85.0	95.5	96	94.5	88

* From A. Hrdlička, Report on an Additional Collection of Skeletal Remains from Arkansas and Louisiana, *Jour. Acad. Nat. Sci. Phila.*, xiv, 1909, pp. 171-249.

These data are of interest in a number of additional particulars. In the first place, it is seen that, barring capacity, a striking similarity exists in the relation of female to male measurements in the different groups of Indians. There are reasons to believe that such resemblances are not confined to these tribes alone or even to Indians generally, but extend, with a limited range of variation, to all races.

Another remarkable fact is that the external measurements of the skull, especially the mean diameter or module, and the circumference show practically identical percental relations in the two sexes, averaging each about 96 for the female to 100 for the male; while in capacity the difference is decidedly greater (less than 90 to 100) in favor of the male, notwithstanding the fact that the thickness of the female skulls averages smaller. In other words, a female skull only nine-tenths as thick as that of a male and which gives external measurements that compare with those of the male cranium in a ratio of 96 to 100, will stand in respect to its internal capacity toward the male skull as only 88 or 89 to 100. The cause of this must be attributed to the unequal build, in the two sexes, of those parts of the skull which are not reached by the ordinary external measurements, and the narrower and especially the lower frontal region in the female plays probably a large part in this connection.

RELATION OF SIZE OF SKULL TO STATURE

The size of the head, as is well known, increases with stature. This increase is not uniform, but progresses in a diminishing ratio. The fact holds true in all races, though the exact values of the ratio with the different racial elements have not as yet been determined definitely. In the case of skeletal remains, in which it is not possible to learn the exact stature, the most suitable manner of obtaining light on the subject is to compare the length of the femur with the cranial capacity, by which means we ascertain the number of cubic centimeters of the capacity that correspond to each centimeter of the length of the femur. The following data give the results of such

a comparison among the Munsee and on Indian skeletal remains from Arkansas and Louisiana.¹

IV. MUNSEE CRANIA: RELATION OF SKULL CAPACITY TO STATURE *

MALES

Number	Bicondylar length of right femur	Skull capacity	Femoro- cranial index (= c.c. of skull capacity per 1.0 cm. of femoral length)
	cm.	c. c.	
285,305.....	43.4	1,530	35.3
285,301.....	44.2	1,515	34.3
285,308.....	45.1	1,720	38.1
285,303.....	45.1	1,515	33.6
285,313.....	45.3	1,550	34.2
285,326.....	46.6	1,470	31.5
285,306.....	48.1	1,505	31.3
Averages.....	(7) (45.4)	(7) (1,544)	(7) (34.0)
Exclusive of 285,308.....	45.4	1,514	33.3

FEMALES

285,302.....	39.4	1,295	32.8
285,337.....	40.2	1,225	30.4
285,320.....	42	1,280	30.5
285,309.....	42.3	1,300	30.7
285,310.....	43	1,375	32.0
285,321.....	43.5	1,310	30.1
285,304.....	43.8	1,275	29.1
285,307.....	44.7	1,240	27.7
Averages.....	(8) 42.4	(8) 1,288	(8) 30.4

COMPARATIVE DATA

MALES

Arkansas (5).....	45.1	1,446	32.1
Louisiana (7).....	44.4	1,434	32.3

FEMALES

Louisiana (5).....	41.7	1,330	31.9
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* Arranged on the basis of stature (i. e., length of femur).

The results presented in the table show considerable individual variation in the femoro-cranial index, by reason of which there is some irregularity of alignment of the cases. This is especially true in regard to the capacity, which in this small series shows little

¹ Published by the writer in his *Report on an Additional Collection*, etc., op. cit., 1909, pp. 179, 188.



MALE MUNSEE SKULL, NO. 285,303, U.S.N.M. (SIDE VIEW)

regularity or evidence of conformity with the aforementioned general rule of increase of the size of the head with stature. The tallest of the eight females had one of the smallest heads, and the man with the largest brain was not even of average height. However, there is no doubt that if the series of skulls was considerably larger, the usual progression, showing gradual increase in the size of the brain with the height of the body, would be apparent.

The femoro-cranial index progresses much more regularly than the capacity, and shows another well-known fact, also common to all human races, namely, that while the absolute size of the brain enlarges in proportion to the stature, its relative dimensions with reference to stature diminish as the latter increases; so that while the tall man or woman may be expected to have an absolutely larger brain than the average of his group, relatively to his stature he will have less brain matter than the short individuals of the same group.

The averages in the preceding table are interesting in another particular—i. e., the difference in the value of the femoro-cranial index in the two sexes. Both the former records of the Louisiana crania and those of the Munsee now presented show these indexes to be perceptibly lower in the females than in the males. The superiority in this respect among the male crania is seen not only in the averages, but practically throughout the records, seven of the eight indexes in the females being below the minimum of the indexes in the males. It seems evident that among the Indians the brain substance in the females is not only absolutely smaller than in the males, but is also somewhat smaller for each centimeter of stature, so that men of the same height as the women would still show an advantage in this particular. This advantage is not necessarily connected with mentality, but may be due to the greater muscularity of the males.

As to the value of the femoro-cranial index in different tribes, we can as yet say nothing positive. The indications are that if differences exist, they are not of a very pronounced character.

SIZE AND SHAPE OF THE FACE

The measurements chosen, as in the writer's work previously cited, are only the most essential. They include the total and upper length of face, and the three breadth measurements—the smallest breadth of the forehead, the greatest facial breadth in the plane of the zygomatic arches, and the breadth at the angles of the lower jaw. As to the total facial length (chin-nasion), wherever the teeth were worn due allowance for the wear was made on the basis of measurements on well-preserved teeth of the same sex and in the same group.

The results, presented in the next table, show that among the Munsee the face was of only fair height and that its other dimensions were rather subdued for Indians.

V. MUNSEE CRANIA: MEASUREMENTS RELATING TO SIZE AND SHAPE OF THE FACE *

MALES

Number	Total length of face (chin-nasion)† (x)	Upper length of face (prosthion-nasion) (y)	Breadth of face (diam. bizyg. max.) (z)	Facial index total $\frac{x \times 100}{z}$	Facial index upper $\frac{y \times 100}{z}$	Cephalic index of the skull (for comparison)	Diameter frontal minimum cm.	Diameter bigonial cm.
285,303.....	11.8	6.8	13.7	86.1	49.6	70.4	9.3	11
285,306.....	12.2	7.0	13.9	87.8	50.4	74.9	9.5	11.9
285,326.....	12.1	6.9	13.6	89.0	50.7	(‡)	8.7	10.6
285,313.....	12.0	7.2	14.0	85.7	51.4	76.6	9.0	9.5
285,308.....	12.6	7.4	14.2	88.7	52.2	73.7	10.1	11.1
285,305.....	12.1	7.2	13.6	89.0	52.9	(§)	9.6	9.5
285,301.....	12.3	7.6	14.2	86.6	53.5	(§)	9.5	9.3
Averages.....	(7) 12.15	(7) 7.15	(7) 13.9	(7) 87.6	(7) 51.5	.....	(7) 9.4	(7) 10.4

FEMALES

285,310.....	11.9	7.0	13.6	87.5	51.5	(§)	9.8	10.3
285,327.....	11.2	6.6	12.4	90.3	53.2	74.4	8.4	8.7
285,302.....	11.9	7.0	12.8	93.0	54.7	(§)	9.3	9.8
285,307.....	(?)	6.8	12.4	.....	54.8	76.9	8.5	.....
285,304.....	11.8	7.3	12.9	91.5	56.5	(§)	9.4	9.6
Averages.....	(4) 11.7	(5) 6.9	(5) 12.8	(4) 90.5	(5) 54.1	.....	9.1	9.6

* Arranged on the basis of the Upper Facial Index.

† Where teeth were worn off, due allowance was made for the defect, the normal enameled portion of median incisors in apposition being taken as 19 mm. high, in the men.

‡ Slightly deformed.

§ Deformed.

The bizygomatic breadth, though not really small, is below the average in many other tribes of Indians, while the frontal breadth and that of the lower jaw are also somewhat below the medium. These results bear out the statement made under "General Observations" (p. 20) relative to the moderate proportions of the face of the Munsee. Comparative data given in the second part of this report indicate that in some of these respects, especially in the height of the face, the Munsee were somewhat exceptional among the Eastern tribes.

The facial indexes indicate mild chamæprosoy to mild leptoprosoy. Both the total and the upper indexes are perceptibly higher in the females, which on analysis of the measurements is seen to be due to the relatively greater narrowness of the face in the female, which, in turn, is doubtless connected with a relatively smaller development of the temporal muscles, the main muscles of mastication. The same condition was noticeable in the crania from Arkansas and Louisiana previously reported by the writer, and is probably quite general among Indians. Some of the foreheads and some of the lower jaws among the Munsee, as will be seen from the details, were relatively quite narrow.



MALE MUNSEE SKULL, NO. 285,303, U.S.N.M. (VIEW FROM ABOVE),
SHOWING TYPICAL FEATURES

ORBITS. NOSE

With respect to the orbits, the writer follows his invariable custom of making measurements on both sides and recording the mean, which, in turn, gives rise to a mean index. This procedure is necessary in view of the fact that in only a minority of cases are the two orbits of equal dimensions and that sometimes they differ considerably.¹

Among the series of Lenape crania which the writer reported on in 1902,² there were several specimens in which the orbits were unusually low. At that time it seemed as if this feature might be almost characteristic of these Indians; but evidently such is not the case, for low orbits are quite rare among the Munsee. As will be seen from the following figures, in only one instance (male, no. 285,313) are the orbits decidedly low and broad, giving the microseme³ index of 78.1. Of the remaining cases four males and two females (43 per cent) are mesoseme, while two of the males and five of the females (50 per cent) are megaseme. The extensive fluctuation of the orbital index in both sexes of the Munsee tribe is very striking, but much the same variation was observed in the Arkansas and Louisiana crania previously mentioned, and is present among the Eastern tribes in general.

VI. MUNSEE CRANIA: ORBITS,* NOSE †

MALES

Orbits				Nose			
Number	Mean height (a)	Mean breadth (b)	Mean index $\frac{b \times 100}{a}$	Number	Height	Breadth	Index $\frac{B \times 100}{H}$
	cm.	cm.			cm.	cm.	
285,313.....	3.2	4.1	78.1	285,303	5.0	2.2	44.0
285,308.....	3.4	3.95	86.1	285,326	5.0	2.35	47.0
285,303.....	3.4	3.9	87.2	285,301	5.45	2.6	47.7
285,305.....	3.6	4.05	87.2	285,305	5.0	2.5	50.0
285,306.....	3.35	3.75	80.3	285,308	5.3	2.8	52.8
285,326.....	3.3	3.6	91.7	285,306	5.0	2.9	58
285,301.....	3.6	3.9	92.9	285,313	5.15	3.0	58.3
	(7)	(7)	(7)		(7)	(7)	(7)
Averages.....	3.4	3.9	87.5		5.1	2.6	51.1

* Arranged on the basis of the Orbital Index.

† Arranged on the basis of the Nasal Index.

¹ It seems advisable to mention at this point the exact method used by the writer in the measurement of the orbits, for there appears to be not a little discrepancy in this respect among different workers. The measurements are those of Broca: The breadth is from dacryon (the point of intersection of the lacrymo-frontal suture and the sharp free orbital border of the lacrymal canal) to the most distal part of the lateral boundary of the orbit, below the malo-frontal suture; while the height is the maximum height, from about the center of the lower border of the orbit. Both dimensions can be taken with fair accuracy by either a graduated rod or by the two sharp points of the *compas glissière*. The main point is that the measurements should not comprise any part of the borders of the orbits, particularly the outer one, which differs considerably in thickness and breadth, and part of which seems not infrequently to be included by those who take these measurements.

² *Crania of Trenton*, etc., op. cit.

³ Broca's classification.

VI. MUNSEE CRANIA: ORBITS, NOSE—Continued

FEMALES

Orbits				Nose			
Number	Mean height (a)	Mean breadth (b)	Mean index $\frac{b \times 100}{a}$	Number	Height	Breadth	Index $\frac{B \times 100}{H}$
	cm.	cm.			cm.	cm.	
285,321.....	3.3	3.8	86.8	285,304	5.3	2.5	47.7
285,310.....	3.4	3.85	88.3	285,302	4.9	2.4	49
285,307.....	3.5	3.85	90.3	285,347	5.0	2.5	50
285,309.....	3.3	3.65	90.4	285,309	4.9	2.6	53.1
285,327.....	3.4	3.6	94.4	285,310	5.0	2.7	54
285,304.....	3.5	3.7	94.6	285,327	4.8	2.6	54.2
285,302.....	3.55	3.65	97.9	285,320	4.9	2.7	55.1
				285,307	4.8	2.7	56.3
				285,321	5.2	3	57.7
	(7)	(7)	(7)		(9)	(9)	(9)
Averages.....	3.4	3.72	91.7		5.0	2.65	52.9

The average orbital index in the female Munsee is higher than that in the males, as is generally the case, a fact directly due to the heavier development of the supraorbital region in the males.

The *nose* in many of the individual Munsee, in conformity with the rest of the upper face, was rather short, but occasionally it was quite broad. The indexes, according to Broca's classification, give four instances (25 per cent; 3 m., 1 f.) of leptorhinc, four cases (25 per cent; 2 m., 2 f.) of mesorhinc, and eight cases (50 per cent; 3 m., 5 f.) of moderately platyrhinc nasal aperture, the averages falling both in mesorhinc. The usual accompaniments of platyrhinc in the negro nose, however, are invariably absent, the inferior borders of the aperture being moderately sharp and the bridge showing generally a fair development.

PROGNATHISM

Measurements relating to prognathism include three basal diameters, namely, from basion to prosthion, the subnasal point and nasion; and the subnasal (alveolar) height, with the heights from prosthion and the subnasal point to nasion. These lines connected give us, in skulls in which the facial parts are well preserved, the angle of the face as a whole and also the alveolar angle, which it is important to measure separately.

An extended and meritorious report on the naso-alveolo-basilar angle such as here described was published in 1909 and 1910 by Dr. P. Rivet,¹ who commenced its determination independently by the

¹ *L'Anthropologie*, xx, 1909, pp. 35 et seq., 175 et seq.; 1910, pp. 505, 637.



MALE SKULL, NO. 99-6669, A.M.N.H., FROM MANHATTAN ISLAND
(FRONT VIEW)

VII. MUNSEE CRANIA: PROGNATHISM, FACIAL AND ALVEOLAR*

MALES

Number	Basion-prosthion line (a)	Basion-subnasal point † (b)	Basion-nasion (c)	Prosthion-nasion height (d)	Prosthion-subnasal point height (e)	Facial angle (angle between a and d)	Alveolar angle (angle between a and e)
	cm.	cm.	cm.	cm.	cm.	°	°
285,306.....	10.5	9.7	10.4	7	2.1	70	62
285,308.....	10.2	9.2	10.3	7.4	2.2	70	58
285,301.....	10	8.8	10.4	7.6	2.3	72	54
285,305.....	9.4	8.6	10.0	7.2	2.2	74	64
285,328.....	9.9	8.9	10.3	6.9	2.0	74	56
285,303.....	9.5	8.7	10.2	6.8	1.9	77	61
	(6)	(6)	(6)	(6)	(6)	(6)	(6)
Averages.....	9.9	9.0	10.3	7.15	2.1	73	59
285,307.....	10.4	9.2	10.1	6.8	2.1	69	52
285,327.....	9.4	8.4	9.7	6.6	1.9	74	55
285,302.....	9.0	8.0	9.6	7.0	2.2	74	58
285,304.....	10	9.0	10.5	7.3	2.1	74	58
285,310.....	9.4	8.4	10.2	7	2.1	76	58
	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Averages.....	9.6	8.6	10	6.9	2.1	74	57

* Arrangement of cases based on Facial Angle.

† The "subnasal point" of the writer is the lowest point on the inferior border of the nasal aperture on the left side: it is the point from which the height of the nose is measured.

same method as that of the present writer and almost simultaneously with him; but no comparisons are as yet available in regard to the alveolar angle. It appears from Rivet's data that among modern white adults the average of the facial angle, as herein defined, ranges in round numbers from 70.5° to 73°;¹ among the negroes, the mean of Rivet's series gives 68.5°; among several groups of American Indians it was 68° to 71.5°. Rivet calculated his indexes mathematically and with the help of an "abaque," while the writer obtained his results by the direct (graphic) method, which, for small series of calculations and used with precision, seems to him preferable, although the results are probably quite comparable. By this method the writer obtained on the Arkansas and Louisiana crania, previously reported, averages ranging for the facial index from 70° to 74° for the males, and 68° to 70° for the females; while the alveolar angle gave the average of 55° to 60° in the males, and 51° to 53° in the females. The Munsee crania give the rather high average of 73° for the males and 74° for the females, with respect to the facial angle, and 59° in the males with 57° in the females for the alveolar angle. These

¹ An exceptional group of Wends reached 76.5°.

figures indicate that both the facial and the alveolar protrusion in the Munsee was exceedingly moderate for a group of Indians, although in a measure the height of the indexes is due to the shortness of the face.

PALATE

It was possible to obtain satisfactory measurements of the palate (or, more strictly speaking, the upper alveolar arch) in 13 instances, which, in view of the usually frequent defects of the arch, is a good proportion of the cases. The measurements and indexes follow Turner's method, which is quite satisfactory.¹ The greatest length recorded by Turner in 20 European male and 8 European female skulls was 6 cm., the smallest 4.7 cm.; the greatest breadth 6.9 cm., the smallest 5.6 cm. The same measurements among the Munsee range, if we take both sexes together, from 5.1 cm. to 6 cm. for length and 5.9 cm. to 7.2 cm. for breadth, showing both dimensions, though more especially the breadth, to be slightly superior in these Indians to what they are in whites. The palatal or "uranic" index averaged, in Turner's whites, 116.2 in the males and 115.6 in the females; in the Munsee the averages are 120.7 for the former and 120.5 for the latter sex, showing the palate in these Indians to be more "brachy-uranic," or relatively broader. The sexual differences in both Turner's and the present series are so small as to be practically negligible. In the different groups of Arkansas and Louisiana crania, reported in 1909 by the writer, the average palatal index ranged from 116 to 122 in the males and from 115 to 122 in the females—conditions very similar to those shown in the present observations.

It may here be pointed out that the whole subject of the dimensions of the palate or alveolar arch in the different races, and especially in the different types of skull, needs investigation. As it is, the variety in the dimensions and shape of these structures, and especially their correlation with the rest of the face and skull, are only imperfectly understood.

¹ Length: "From the alveolar point to a line drawn across the hinder borders of the maxillary bones. Breadth: Maximum external just above the molar teeth."



MALE SKULL, NO. 99-6669, A.M.N.H., FROM MANHATTAN ISLAND (SIDE VIEW)

VIII. MUNSEE CRANIA: PALATE;* LOWER JAW;** FORAMEN MAGNUM

MALES

Palate				Lower jaw						Foramen magnum	
Number	Length	Breadth	Index $\frac{B \times 100}{L}$	Number	Height at sym- physis†	Thick- ness at 2d left molar‡	Diam- eter bigo- nial	Mini- mum breadth of ramus	Angle (mean)§	Number	Mean diam- eter $\frac{L+B}{2}$
	cm.	cm.			cm.	cm.	cm.	cm.	°		cm.
285,316	5.8	6.7	115.5	285,316	3.4	1.5	.....	3.7	.....	285,301	3.3
285,301	5.8	6.9	119	285,303	3.6	(¶)	11	3	120	285,305	3.3
285,306	5.7	6.8	119.3	285,305	3.6	1.3	9.5	3.5	117	285,308	3.5
285,315	6	7.2	120	285,313	3.6	1.4	9.5	3.6	116	285,306	3.5
285,326	5.5	6.6	120	285,301	3.7	1.3	9.3	3.6	116	285,308	3.6
285,305	5.3	6.4	120.8	285,306	3.8	1.3	9.5	3.5	117	285,326	3.6
285,308	5.7	7.0	122.8	285,326	3.8	1.3	10.6	3.2	116	285,313	3.8
285,303	5.1	6.6	129.4	285,308	3.9	1.6	11.1	3.4	121	.....	.....
.....	.....	.....	.....	285,315	3.9	1.8	10.9	4.0	121	.....	.....
Averages..	(8) 5.6	(8) 6.8	(8) 120.7	(9)	(8) 2.7	(8) 1.5	(8) 10.5	(9) 3.5	(8) 118	(7)	(7) 3.5

FEMALES

285,327	5.1	5.9	115.7	285,324	3.2	1.5	9.6	3.3	128	285,309	3.1
285,307	5.6	6.6	117.9	285,307	3.2	1.2	8.7	.....	127	285,327	3.1
285,304	5.2	6.2	119.2	285,310	3.4	1.6	10.3	3.5	131	285,304	3.2
285,302	5.2	6.4	123.1	285,321	3.5	1.65	.....	3.5	.....	285,310	3.2
285,310	5.2	6.6	126.9	285,347	3.5	1.6	.....	3.4	128	285,302	3.3
.....	.....	.....	.....	285,302	3.7	1.5	9.8	2.8	140	285,320	3.3
.....	.....	.....	.....	285,320	.....	.....	.....	3.1	123	285,347	3.3
.....	.....	.....	.....	285,309	.....	.....	.....	.....	130	285,307	3.4
Averages..	(5) 5.25	(5) 6.35	(5) 120.5	(6)	(6) 2.4	(6) 1.5	(4) 9.6	(6) 3.2	(7) 129	(8)	(8) 3.2

* Arranged on the basis of the Palatal Index.

** Arranged on the basis of the height at symphysis.

† The vertical height in median line.

‡ Measured with the *compas glisier* in such manner that the center of the second molar or of its alveolus corresponds to the middle of the rod of the compass between the two branches which are applied to the ramus.

§ Measured with Broca's goniometer.

¶ Moderate.

FORAMEN MAGNUM

In respect to the foramen magnum, there is so much irregularity and so little special significance in the ratio between the two main diameters, length and breadth, that the writer prefers to use the mean measurement, $(\frac{l+br}{2})$, which stands in some relation to stature and probably to muscular development, and which may have more than passing interest in the study of racial and other groups. The average in the Munsee is, as usual, perceptibly higher in the males

than in the females. It is almost identical in both sexes with that of the Indian skeletal remains from the Louisiana mounds (Munsee, 7 males, 3.5; 8 females, 3.2; Louisiana, 10 males, 3.45; 14 females, 3.18 cm.), which were nearly alike in stature, but it is slightly superior to that of the Indians from Arkansas, who were also of practically the same height (Arkansas, 22 males, 3.3; 16 females, 3.14 cm.).

LOWER JAW

The measurements of the lower jaw show only moderate dimensions throughout. The angle (mean of the two sides, which usually differ somewhat in this respect) averages decidedly higher in the females (130°), which is not always the case in American crania. Thus among the Arkansas and Louisiana mound crania it averaged 118.5° in the males, or practically the same as in the Munsee; while it was only 122° in the females, or eight points lower than in the Munsee of the same sex.

DETAILED OBSERVATIONS ON THE CRANIA

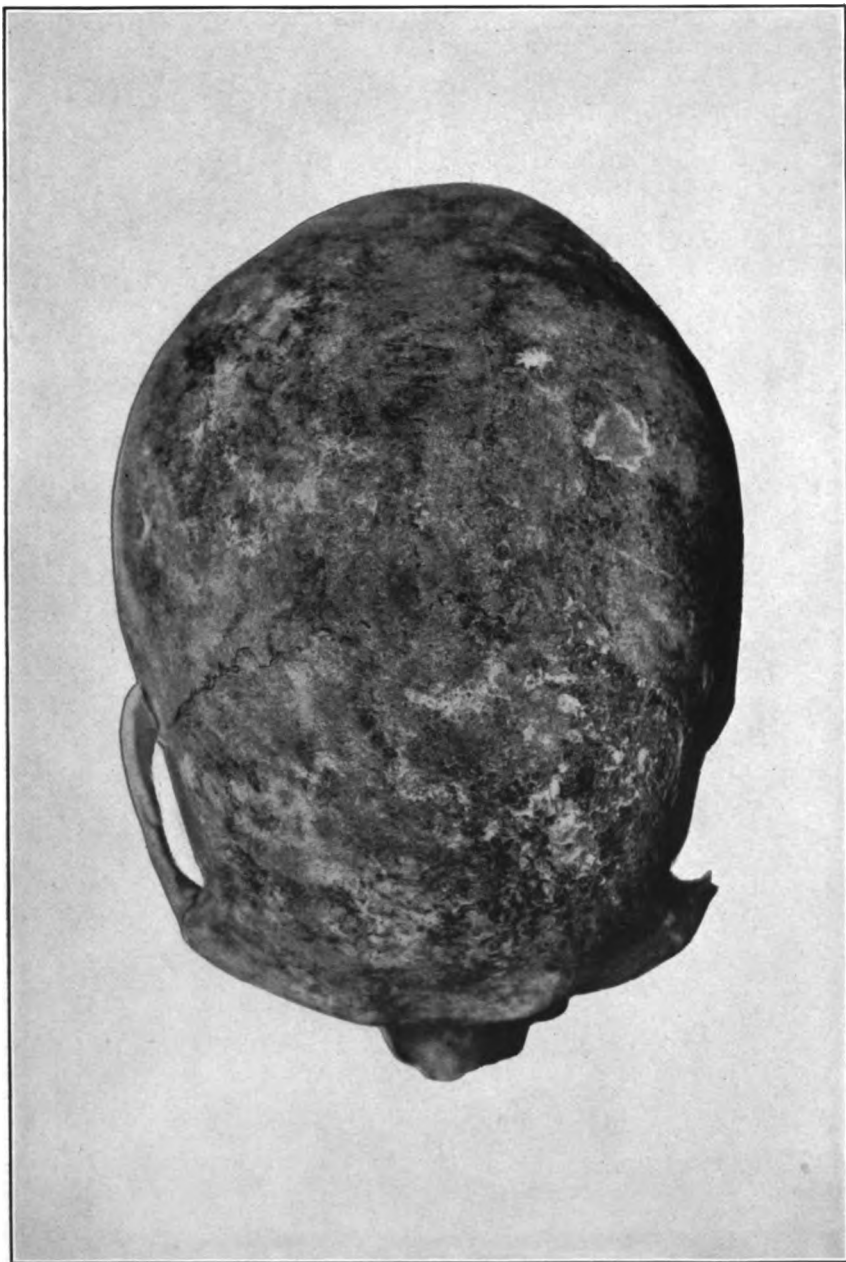
In visual examination of a series of crania or other bones of more than passing importance, general impressions are not sufficiently accurate or reliable; consequently, the writer habitually makes detailed notes of the principal features of each specimen in accordance with a definite though simple scheme. Such notes can be tabulated and analyzed almost as readily as measurements.

In choosing the points for observation, the only rule that can be formulated is to include everything of consequence, and to cover the whole specimen, which is not so easily accomplished as at first might seem. Some of the points touched upon in such a procedure will, of course, be of much less weight than others, but they serve to complete the picture and will doubtless be of some interest and value in future comparisons; while purely individual characteristics that might be included by some authors may be passed entirely.

The results of the detailed examination of the Munsee crania are as follow:

THE VAULT: FOREHEAD

The conditions found in respect to the frontal region will be clearly seen from the accompanying table. As general among Indians, this region in the Munsee skulls shows high development only in exceptional cases. In the males there is frequently more or less of a slope; in the females, where slope is rare, low foreheads prevail.



MALE SKULL, NO. 99-6669, A.M.N.H., FROM MANHATTAN ISLAND
(VIEW FROM ABOVE), SHOWING LONG OVOID OUTLINE

IX. MUNSEE CRANIA: FRONTAL REGION

	9 males		11 females	
	Cases	Per cent	Cases	Per cent
Exceptionally good development.....			1	9
Medium.....	5	56	4	36
Low.....	1	11	5	45
Slight to moderately sloping.....	3	33	1	9

SAGITTAL REGION

The vault of the skull among Indians is frequently more or less arched or keeled, indicating strong development of the temporal muscles. This characteristic is of course much more frequent and pronounced in the males than in the females. The Munsee, it will be seen, show no exception in this respect. The elevation of the sagittal region is present in nearly all the males, although it is seldom pronounced. Among the females nearly half are without sagittal elevation, while in the remainder this feature is only slightly developed.

X. MUNSEE CRANIA: SAGITTAL REGION

	9 males.		12 females	
	Cases	Per cent	Cases	Per cent
Oval or nearly so.....	1	11	5	42
Slightly elevated or keeled.....	4	44	5	42
Moderately keeled.....	2	22	1	8
Markedly keeled.....	2	22	1	8

TEMPORO-PARIETAL REGION

The temporo-parietal region differs in convexity with the type of the skull, being usually quite flat in pronounced dolichocephaly and decidedly convex in marked brachycephaly. Besides this, it is also subject to individual and groupal variations. In the series at hand, in two-thirds of both the male and the female skulls the region is of about medium convexity. Among the remainder of the specimens it is rather interesting to note that while in a third of the cases in the males the region is flat and in no case bulging, these conditions are practically reversed in the females. The temporo-parietal region of the brain tended evidently to a greater relative development in the females of this series than in the males.

XI. MUNSEE CRANIA: TEMPORO-PARIETAL REGION

	9 males		12 females	
	Cases	Per cent	Cases	Per cent
Bulging.....			3	25
Medium convexity.....	6	67	8	67
Rather flat.....	3	33	1	8

OCCIPUT

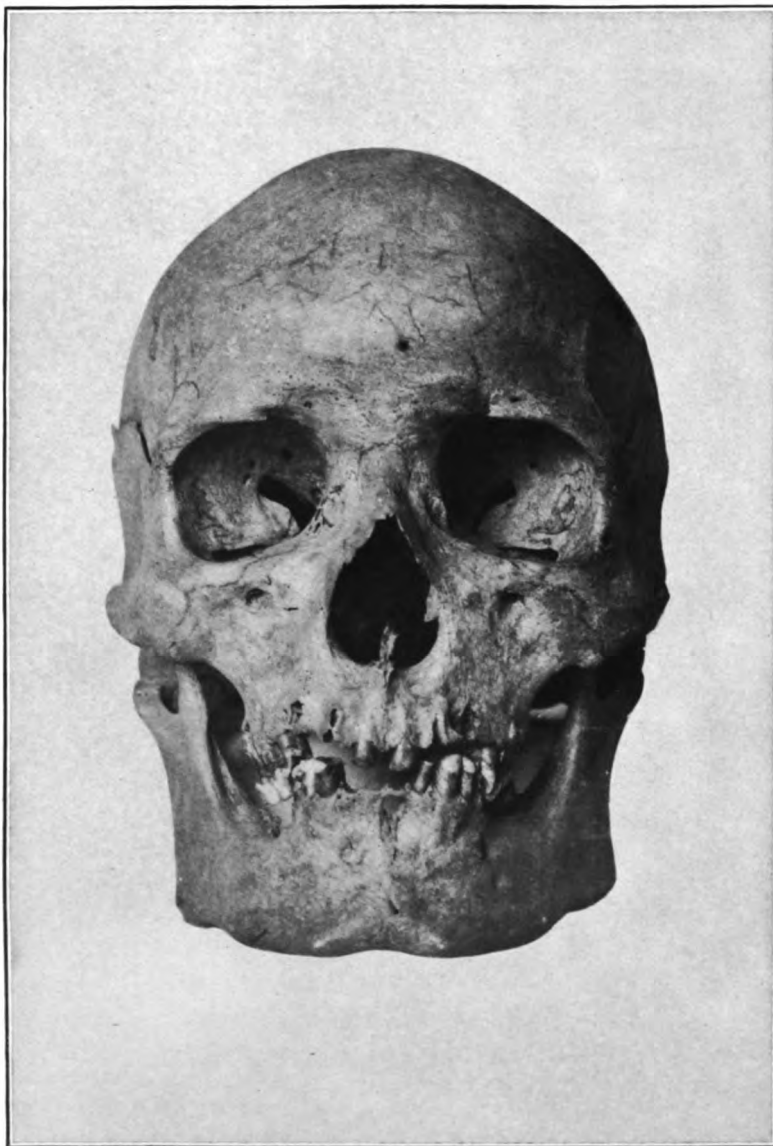
When we eliminate all the cases that show any trace of artificial flattening of the back of the skull, there remain only a few specimens for observation. Among these, three-fourths show medium convexity of the occiput, while in one-fourth the region is protruding. There is no difference in this respect in the two sexes. The external occipital protuberance and the occipital ridges do not show especially strong development in any case, and barring a single instance of the occurrence of an Inca bone, which will be spoken of in another connection, there are no anomalies of this region to be recorded.

XII. MUNSEE CRANIA: OCCIPUT (IN THE UNDEFORMED)

	4 males		4 females	
	Cases	Per cent	Cases	Per cent
Medium prominence.....	3	75	3	75
Protruding.....	1	25	1	25
Slightly asymmetric.....	1	(25)	1	(25)

SUTURES: SERRATION

The serration of the cranial sutures is of interest for the reason that in the skulls of whites and in superior skulls generally the knitting is often, though not invariably, quite complex, while in the majority of the skulls among the retarded races it is more or less simple and may occasionally be nearly absent. For the sake of simplicity in recording the nature of the sutures the writer refers to the serration as "medium," or about as it averages in whites; "submedium," which is self-explanatory; and "poor," or such as approaches a simple wavy line. Among the Indians the sutures range mostly from submedium to more simple, and the Munsee skulls form no exception. As seen from the actual data not one case reaches the standard of medium complexity in all the sutures, while in a large proportion of the specimens the serration of most, if not all, is decidedly inferior. No special difference exists in this respect between the skulls of different sizes.



MALE MUNSEE SKULL, NO. 285,308, U.S.N.M. (FRONT VIEW)

XIII. MUNSEE CRANIA: SERRATION OF SUTURES

	7 males		11 females	
	Cases	Per cent	Cases	Per cent
Medium (about as average in whites).....				
All sutures of the vault submedium.....	2	29	5	45
All poor.....	2	29	5	45
Coronal and lambdoid submedium, sagittal medium.....	2	29	1	9
Coronal quite simple, sagittal and lambdoid nearly medium.....	1	14		

OCCLUSION OF SUTURES

In none of the specimens at hand can be detected any premature occlusion, though in this respect it is impossible to be certain as to the temporo-occipital articulations. Unfortunately, there is no possibility of giving the exact relation of age to the occlusion in any of the sutures; all that it is possible to determine is their relative involvement. The order among the males is S-C-TO-L;¹ that in the females, TO-S-C-L. It is plain that occlusions in the coronal and temporo-occipital sutures are almost as early and frequent as those in the sagittal, while those in the lambdoid are decidedly later. As to locality, the coronal suture occludes first below the temporal ridges; in the sagittal the commencement is most frequent, as usual, about obelion; in the lambdoid it is irregular; while in the temporo-occipitals in the Munsee it advances generally from the anterior or basal extremity of these sutures backward and upward.

XIV. MUNSEE CRANIA: OCCLUSION OF SUTURES (EXTERNALLY, ALL GRADES)

	9 males		12 females	
	Cases	Per cent of skulls	Cases	Per cent of skulls
Coronal.....	6	67	4	33
Sagittal.....	7	78	4	33
Lambdoid.....	2	22	2	17
Temporo-occipital.....	5	56	5	42

WORMIAN BONES

The frequency of Wormian bones in any given series of skulls, while a factor of no great importance, is always of some interest. It is certain that in this respect there is a wide difference even in different groups of the same people, such as the Indians. Among the Munsee, as already mentioned, we find a remarkable scarcity of these ossicles, especially in the males. Not only are the Wormian

¹ S=sagittal; C=coronal; TO=temporo-occipital; L=lambdoid.

bones scarce in this series, but they are also invariably small. This scarcity may in all probability be regarded as a sign of the absence of all disturbances, developmental as well as pathological.

XV. MUNSEE CRANIA: WORMIAN BONES; BREGMA AND "INCA" BONES

Total number present	8 males		12 females		According to sutures	8 males		12 females	
	Cases	Per cent	Cases	Per cent		Cases	Per cent	Cases	Per cent
None.....	3	38	4	33	Coronal.....	1	12		
One.....	3	38	1	8	Sagittal.....				
Two.....	1	12	1	8	Lambdoid.....	4	50	6	50
More than two.....			5	42	Temporo-occipital.....			6	50
Inca bone.....			1	8	Temporo - p a r i e t a l (squamo-mastoid angle).	2	25	2	17
B r e g m a (fontanel) bone.	1	12							

BREGMA AND INCA BONES

Among the 20 crania in which conditions with respect to these facts could be ascertained, there was found one bregma or fontanel bone (3x3.1 cm.), and one of the so-called Inca¹ bones (diameter, 8.3x3.5 cm.). There is nothing especially noteworthy in these occurrences, both of which, particularly the Inca bone, are of the nature of developmental anomalies.

Pterions.—Among the 19 Munsee skulls in which the pterions could be determined there was no case of temporo-frontal contact. In all instances the pterion was of the H type, predominantly narrow in the males and predominantly medium to broad in the females.

XVI. MUNSEE CRANIA: PTERIONS

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Temporo-frontal contact.....				
H type, narrow.....	4	57	1	8
H type, medium.....	3	43	6	50
H type, broad.....			5	42

PARIETAL FORAMINA

These are represented quite poorly. In almost half the skulls there are no parietal foramina at all, while in most of the remainder they range from very minute to medium size, of which latter there

¹ The term is used merely for convenience.

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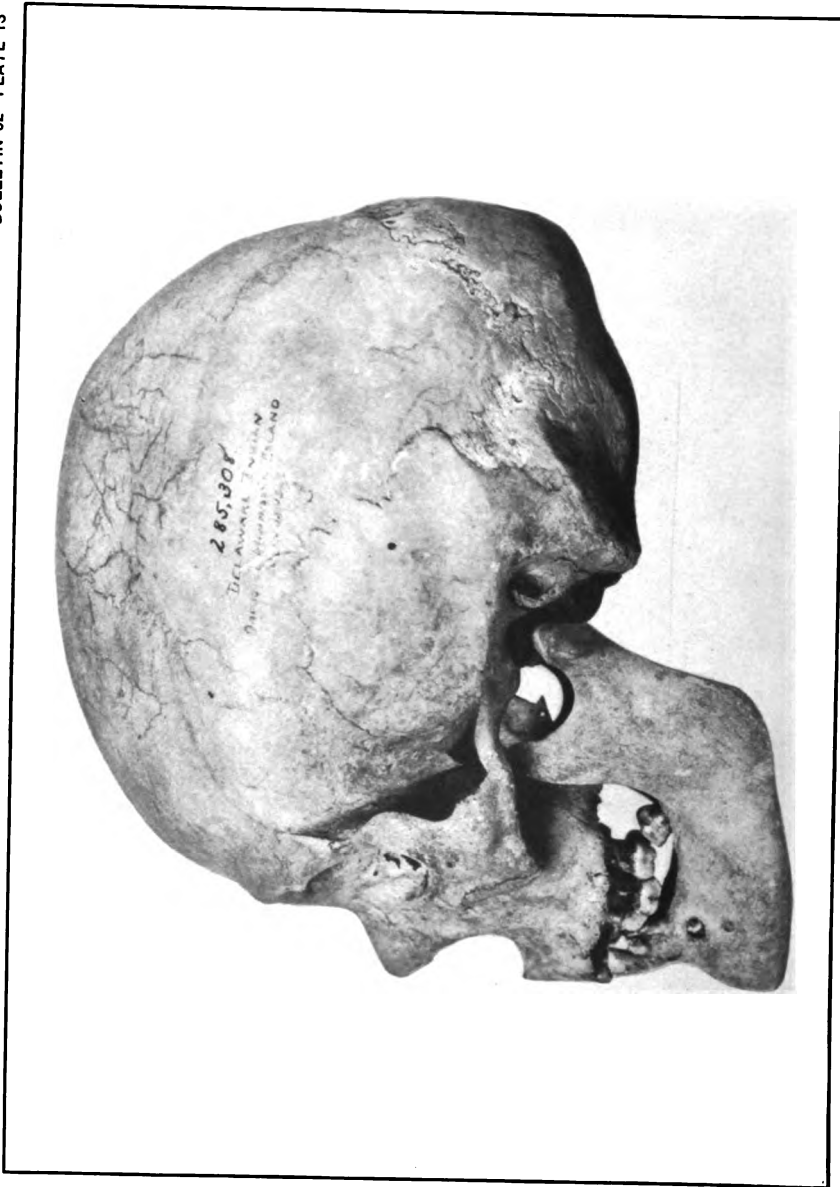
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MALE MUNSEE SKULL, NO. 285,308, U.S.N.M. (SIDE VIEW)

is a single instance, and in only one case are there two canals of medium size. The exact significance of this showing is not clearly understood. When present these canals transmit, as is well known, a small arteriole and an emissary vein which connects the venous systems within and without the wall of the skull.

XVII. MUNSEE CRANIA: PARIETAL FORAMINA

	9 males		12 females	
	Cases	Per cent	Cases	Per cent
None.....	3	33	6	50
1 or 2 minute.....	3	33	1	8
1 medium.....	2	22	4	33
2 medium.....	1	11		
1 medium on right, 2 minute on left.....			1	8

RETROMASTOID FORAMINA

The retromastoid ("mastoid") foramina are most often two in number—a larger and a smaller—one of which transmits a vein from the transverse sinus within to the cutaneous occipital vein on the outside of the skull wall, and the other a smaller branch of the occipital artery. Like the parietal foramina, they show considerable individual and groupal variation in both number and size. It is not uncommon in some Indian crania to find one of these canals to be of very appreciable diameter (up to 4 mm.). While in the Munsee skulls they appear almost generally two on each side, they are in no instance above moderate size, and in several cases are quite minute. Thus in these specimens the retromastoid foramina stand in harmonious rather than compensatory relation with the small or even absent parietal foramina.

XVIII. MUNSEE CRANIA: RETROMASTOID FORAMINA

	8 males		12 females	
	Cases	Per cent	Cases	Per cent
2, moderate size, each side.....	7	88	5	42
2, small to minute, each side.....	1	12	4	33
1, moderate size, each side.....			1	8
2, small to minute, each side.....	1	12	4	33
2, medium, right side; 2 small, left side.....			1	8

MASTOIDS

The mastoid processes are mainly of importance as sexual characteristics. Their value in this respect, however, differs considerably

from racial group to group, and even within a single stem of people, such as the Indians. On the whole, however, it may be said that in the Indian female the mastoid is somewhat more developed than it is in the average white woman. Occasionally it is considerably more developed, reaching the subaverage or even the average dimensions of that of the males in the same tribe. The grade of development of the process is of course related to the strength and activity of the sternocleido-mastoid muscle, to which it gives attachment. Among the Munsee the size of the mastoids on the whole is only moderate; yet even in this series they rise in one of the female skulls to male-like proportions.

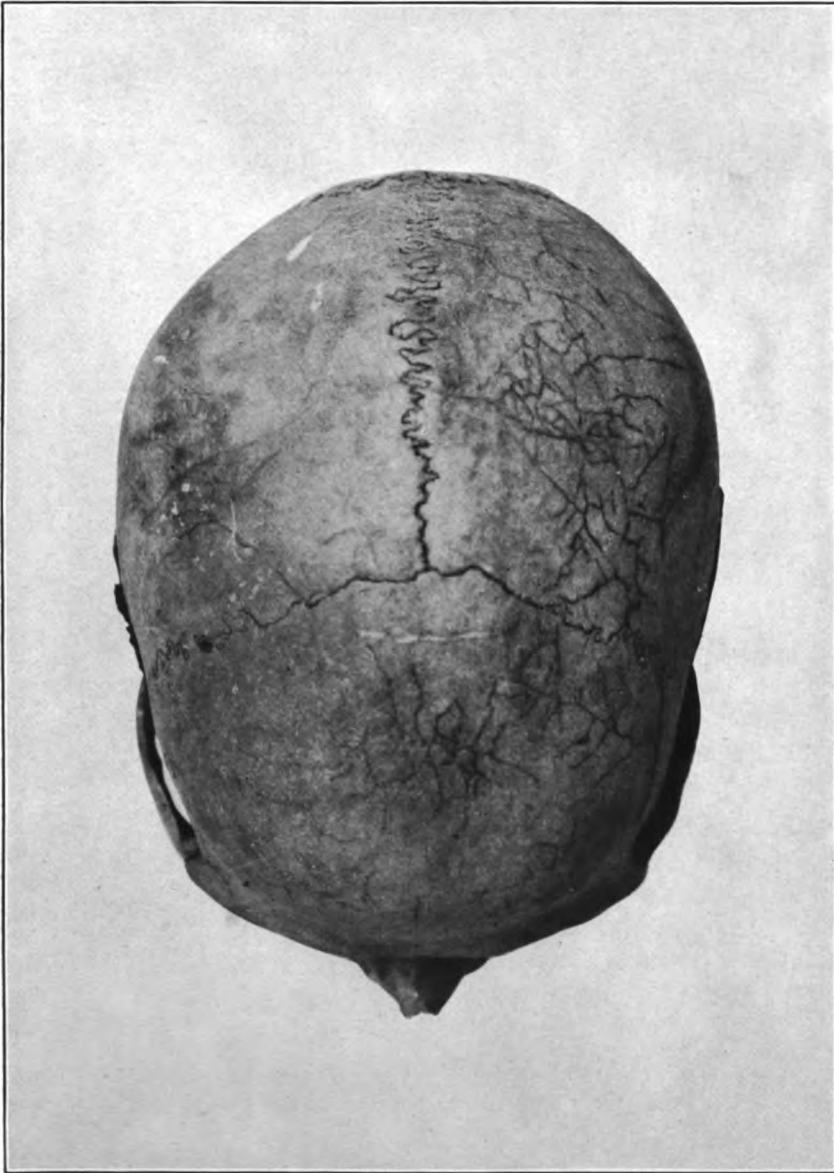
XIX. MUNSEE CRANIA: MASTOIDS

	10 males		12 females	
	Cases	Per cent	Cases	Per cent
Large (masculine).....	1	10	.....	.....
Medium (masculine).....	6	60	1	8
Submedium (feminine).....	3	30	11	92

In one of the females (no. 285,309) the apex of the left mastoid is bifid. Well developed cases of this anomaly are rare; there are only three or four other Indian crania in the large collections of the United States National Museum in which it is well represented. In another female specimen (no. 285,304) the right mastoid shows a peculiar, marked indentation in the middle of its dorsal surface, with a groove extending therefrom upward and backward and downward and backward.

SUPRAORBITAL RIDGES

These ridges, as is well known, are sexual characteristics in the main; phylogenetically they are the remains of the pronounced supraorbital arches of man's anthropoid ancestors and of early man. Like the mastoids they show also considerable individual variation in each sex among the Indians, owing to which they occasionally fail to afford aid in the determination of the sex of the specimen. As a rule they are limited in Indians to the median half to two-thirds of the supraorbital space. In the Munsee skulls at hand they are markedly developed in only one of the males; in two of the male skulls they are small, feminine like, while in two of the female skulls they are so developed as to approximate the supraorbital ridges of the average male.



MALE MUNSEE SKULL, NO. 285,308, U.S.N.M. (VIEW FROM ABOVE)

XX. MUNSEE CRANIA: SUPRAORBITAL RIDGES

	8 males		12 females	
	Cases	Per cent	Cases	Per cent
Pronounced (masculine).....	1	12		
Medium (masculine).....	5	63	2	17
Small (feminine).....	2	25	8	67
Very small.....			2	17

NASION DEPRESSION

The depression at the ridge of the nose is generally well marked in male Indian crania, but is mostly shallow in the female specimens. The depression is never narrow, like a deep line, as in some of the negroes; and in the females it is usually quite wide from above downward. The skulls of the series under consideration show nothing very exceptional in this respect.

XXI. MUNSEE CRANIA: NASION DEPRESSION

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Pronounced.....	1	14		
Medium.....	5	71	2	17
Shallow.....	1	14	5	42
None or scarcely any.....			5	42

NASAL BRIDGE

The development of the nasal bridge differs among the Indians more or less from tribe to tribe, hence it would be erroneous to assume that all Indians, or even a majority in some of the tribes, had high noses. On the other hand, the nasal bridge is never flat and short as in the negro. In the females, as among the whites, the bridge is generally lower than in the males. The observations on the Munsee, among 17 cases in which the bridge is preserved, show 10 of medium height and 7 submedium to low.

XXII. MUNSEE CRANIA: NASAL BRIDGE

	7 males		10 females	
	Cases	Per cent	Cases	Per cent
Medium height.....	6	86	4	40
Submedium height.....	1	14	2	20
Low.....			4	40

NASAL BONES

The chief feature of the nasal bones to which the student usually directs attention is their breadth. There is on this continent a frequency of especially narrow nasals among the Eskimo. Among the Indians, narrow nasal bones occur only exceptionally; more commonly they are rather broad, though the breadth is not excessive. In the present series we find them fairly broad in all the males and in two of the females; narrow (not excessively) in only two of the females.

XXIII. MUNSEE CRANIA: NASAL BONES

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Broad.....	7	100	2	17
Medium.....			8	67
Narrow.....			2	17

NASAL APERTURE

The features of chief interest with respect to the nasal aperture are the fulness or sharpness of the inferior borders, the presence or absence of subnasal fossæ or simian gutters, and pronounced asymmetry. Among the 19 Munsee skulls in which these features can be studied, there are only one instance of moderate grooves and three cases of moderate asymmetry. The lower borders are fairly sharp, more so than the average in many other Indians.

XXIV. MUNSEE CRANIA: LOWER BORDERS OF NASAL APERTURE

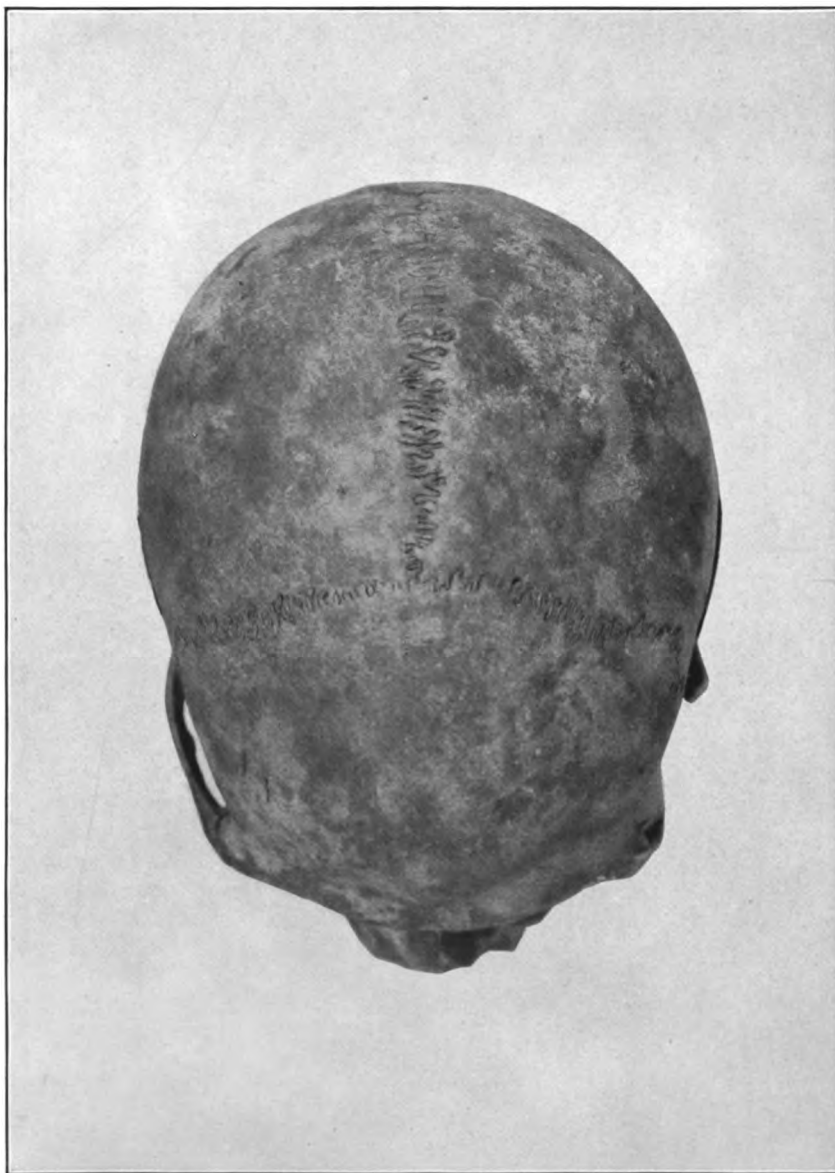
	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Normal, fairly sharp.....	4	57	11	92
Dull.....				
Asymmetric.....	2	29	1	8
Simian grooves.....	1	14		

NASAL SPINE

On the whole the nasal spine reaches its most pronounced development, especially in height, in the modern whites. It is rudimentary or absent in the anthropoid apes, and seldom reaches marked development in the yellow-brown and black races. Among Indians it ranges from rudimentary or very low to fairly well developed. In the Munsee, as shown by the accompanying figures, it was mostly very low to submedium.



UNDEFORMED TYPICAL FEMALE MUNSEE SKULL, NO. 285,309, U.S.N.M.
(VIEW FROM ABOVE)



MALE MUNSEE SKULL, NO. 285,306, U.S.N.M., SHOWING FINE OVOID
OUTLINE



LARGE MALE SKULL, NO. 2010-4423, A.M.N.H., FROM MANHATTAN ISLAND, SHOWING FINE ELLIPTICAL OUTLINE

XXV. MUNSEE CRANIA: NASAL SPINE

	7 males		11 females	
	Cases	Per cent	Cases	Per cent
About as average in whites.....	1	14	3	27
Submedium.....	4	57	6	55
Very low.....	2	29	2	18

ORBITS

In the majority of skulls under consideration, the orbits offer nothing special morphologically; in a number of instances, however, there is an exceptional conformation, the details of which are shown in the table which follows. The data accentuate the fact, already shown by the measurements, of the considerable range of fluctuation in these features, which, however, seems in this case to have little if any anthropological significance, although it may be due in part to admixture with other people.

XXVI. MUNSEE CRANIA: ORBITS

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
No special features.....	3	43	8	67
Lateral axis of each nearly horizontal.....	1	14		
Lateral axis of each decidedly oblique.....	1	14		
Strikingly large.....			1	8
Strikingly small.....	1	14		
Exceptionally high.....			2	17
Exceptionally low.....	1	14		
Right lower and more oblique than left.....			1	8

SUBORBITAL FOSSÆ

These depressions in the upper maxillæ, which, strictly speaking, have only indirect relation to the canine teeth and do not deserve the old name of "canine fossæ," are generally less well marked or hollowed out in the Indian than in whites, although there is considerable individual variation. In the Munsee, in more than half the skulls, they are shallow to very shallow.

XXVII. MUNSEE CRANIA: SUBORBITAL (CANINE) FOSSÆ

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Deeply hollowed.....				
Medium.....	3	43	6	50
Shallow.....	3	43	6	50
Only a trace of depression.....	1	14		

These fossæ are of evolutionary significance. In the anthropoid apes they are either entirely wanting or very nearly so, the region being in fact often moderately convex; and the same is true, so far as the evidence is available, of early man to the latter part of the Neanderthal period.

MALAR BONES. ZYGOMÆ

The malars among the Munsee are of moderate development throughout, and none of the bones shows any complete or even appreciable partial division or other anomaly. The zygomatic processes are rather submedium in strength as compared with those of other Indians, particularly in the males.

In one of the male skulls (no. 285,313) the right zygoma is represented only by a pointed but otherwise unaltered base, the rest of the bone, up to the malar suture, being absent. In all probability this condition is the result of an old fracture, after which the larger part of the zygoma was lost or remained separated.

XXVIII. MUNSEE CRANIA: THE MALARS; ZYGOMÆ

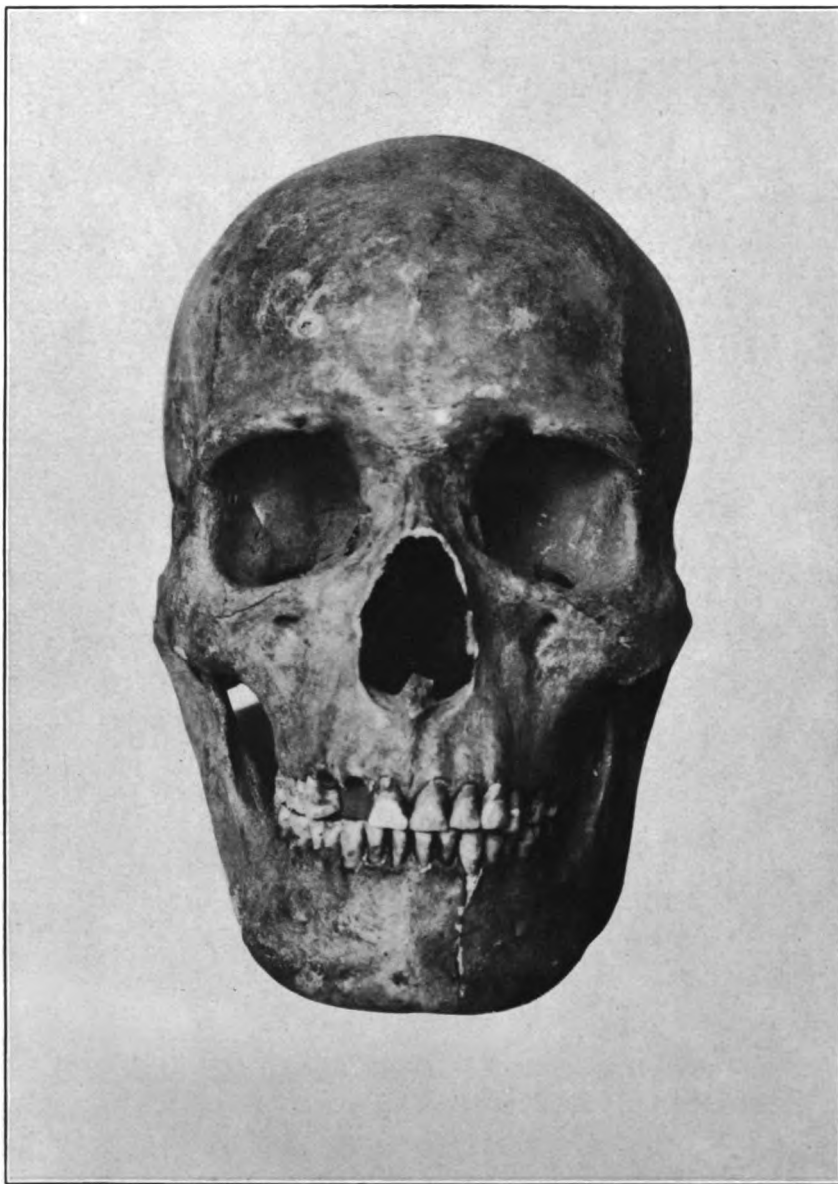
MALARS	9 males		11 females		ZYGOMÆ	7 males		11 females	
	Cases	Per cent	Cases	Per cent		Cases	Per cent	Cases	Per cent
Heavy or protruding.					Very broad.				
Medium development.	9	100	10	91	Medium.	3	43	10	91
Submedium development.			1	9	Submedium (for the sex and race).	4	57	1	9

UPPER ALVEOLAR ARCH

The main feature for observation of the upper dental arch is its slant or prognathism, and conditions in this respect have already been shown in the main by the measurements. The inspection confirms the fact that in three of the female skulls the arch must be described as markedly slanting. In two cases, in both of which the vault of the skull is artificially deformed, the arch is asymmetric; in one of these, however, the asymmetry is evidently due to early loss of some of the teeth. In no case is there any special massiveness of the arch.

XXIX. MUNSEE CRANIA: UPPER ALVEOLAR ARCH

	8 males		11 females	
	Cases	Per cent	Cases	Per cent
Medium slant.	8	100	8	73
Marked slant.			3	27
Asymmetric.	1	(12)	1	(9)



ADULT MALE SKULL FROM MANHATTAN ISLAND, NO. 99-6667, A.M.N.H.,
SHOWING AN EXCEPTIONALLY HIGH AND NARROW FACE

LOWER JAW

In 17 of the 20 Munsee skulls in which the lower jaw is present, the latter is of ordinary (Indian) dimensions and form; in one male and in one female it shows strong development. In a single instance only is the chin square; in the others it is moderately rounded. The prominence of the chin in all cases may be described as approximately medium.

XXX. MUNSEE CRANIA: LOWER JAW

	9 males		11 females	
	Cases	Per cent	Cases	Per cent
Ordinary Indian form and moderate development.....	7	78	10	91
Square chin.....	1	11		
Jaw very strong.....	1	11	1	9

PALATE

The shape of the palate is determined by that of the upper dental arch. Of the skulls at hand, in 11 of the 22 cases the outlines of both the arch and the palate are elliptic, in 7 ovoid, and in 4 parabolic. The tendency toward the parabolic form is more marked in the females than in the males. The height of the palate shows nothing exceptional, and there is no torus worthy of notice.

XXXI. MUNSEE CRANIA: PALATE

	10 males		12 females	
	Cases	Per cent	Cases	Per cent
Ovoid.....	3	30	4	33
Elliptic.....	6	60	5	42
Parabolic.....	1	10	3	25
Torus.....				

BASE OF THE SKULL

Glenoid fossæ.—In general the glenoid fossæ of the Indian skulls resemble those among the whites, but there is considerable individual variation, particularly in spaciousness of the hollows. Among the 22 Munsee crania, in 14 the fossæ are of ordinary form and of about medium dimensions; in one they are narrow antero-posteriorly, in 4 wide; in 1 case their axis is decidedly oblique, and in 2 the fossæ differ in depth on the two sides. The wide fossæ are more frequent in the females.

XXXII. MUNSEE CRANIA: GLENOID FOSSÆ

	10 males		12 females	
	Cases	Per cent	Cases	Per cent
Ordinary form and dimensions.....	8	80	6	50
Narrow (antero-posteriorly).....	1	10	.....	.....
Wide (antero-posteriorly).....	1	10	3	25
Decidedly oblique (laterally).....	.....	.....	1	8
Left shallow, right medium.....	.....	.....	2	17

Floor of auditory meatus.—Among the Indians, and particularly in the young, there are frequently found more or less pronounced defects or dehiscences (Hyrtl) in the floor of the auditory meatus. The frequency of these defects differs from locality to locality and probably from tribe to tribe. They are rather scarce in the Munsee, two-thirds of the crania showing no defect whatever, while of the remainder in only one instance was the perforation large. There seems to be a predominance of this condition in the females.

XXXIII. MUNSEE CRANIA: DEFECTS IN FLOOR OF AUDITORY MEATUS

	10 males		12 females	
	Cases	Per cent	Cases	Per cent
None.....	8	80	8	67
Slight, each side.....	1	10	2	17
Moderate, each side.....	1	10	1	8
Large, each side.....	.....	.....	1	8

Styloid processes.—Among the Indians the styloid processes seldom reach good development, although there is some difference in this respect among the tribes. In a great majority of Indian crania the styloid processes are more or less diminutive, and not seldom they are quite rudimentary or even absent, in the latter case usually only small bases being discernible. In the Munsee only four of the twenty-two skulls show styloids which approach the medium or average in whites; in seven the processes are decidedly submedium; and in eleven they are rudimentary.

XXXIV. MUNSEE CRANIA: STYLOID PROCESSES

	10 males		12 females	
	Cases	Per cent	Cases	Per cent
Medium (about average in whites).....	2	20	2	17
Submedium.....	5	50	2	17
Rudimentary.....	3	30	8	67



BRACHYCEPHALIC EXTRANEOUS FEMALE SKULL, NO. 285,311, U.S.N.M.
(VIEW FROM ABOVE), FOUND WITH THE MUNSEE INDIANS



SKULL OF MUNSEE CHILD OF ABOUT SIX YEARS OF AGE, NO. 285,329, U.S.N.M., SHOWING
FRONTO-OCCIPITAL COMPRESSION

Middle lacerated foramina. Posterior lacerated foramina.—As repeatedly pointed out by the writer on former occasions, the middle lacerated foramina are structures of some importance. They are very small in the anthropoid apes, generally small in negro skulls, submedium to medium in the yellow-brown races and in less developed whites, and reach their maximum spaciousness in civilized modern white men. These differences are connected with the increase in the size of the brain. A growing brain not accompanied with a proportionate or equally rapid increase in the bony structures of the base of the skull (which seems to be most frequently the case) will cause a spreading and bulging of the basal parts, one result of which will be the increased size of the middle lacerated foramina. In the Munsee, in only two of the nineteen skulls in which the basal region is sufficiently well preserved for examination, the foramina about equal in size the average in whites; in nearly half of the remaining skulls they are submedium, and in slightly more than half they are small.

XXXV. MUNSEECRANIA: MIDDLE LACERATED FORAMINA; POSTERIOR LACERATED FORAMINA

	7 males		12 females			7 males		12 females	
	Cases	Per cent	Cases	Per cent		Cases	Per cent	Cases	Per cent
Medium (about as average in whites).....	1	14	1	8	Of equal size.....	1	14	1	8
Submedium.....	5	71	3	25	Right larger.....	5	71	8	67
Small.....	1	14	8	67	Left larger.....	1	14	3	25

The posterior lacerated or jugular foramina are of interest chiefly because of their frequent and often marked inequality in size, which signifies inequality in the size of the lateral sinuses and especially of the internal jugular veins. The right foramen is frequently larger than the left, a phenomenon which has been associated with the prevailing right-handedness in man. In the nineteen Munsee skulls in which the foramina could be examined, they are of about equal size in only two instances; the right is larger in thirteen, or in two-thirds of the cases, while the left is the larger in only four instances. As the proportion of left-handed persons among the Indians averages only about three per cent, it is evident that in some instances the relation between a larger jugular canal and habitual greater use of the arm of the same side would not maintain; besides, we know the motor centers for the right arm and hand to be on the left side of the brain. Possibly greater blood pressure on the right side in right-handed persons, due directly and mechanically to the

greater muscular activity on that side, would be a more satisfactory explanation.

Depressions of the petrous portions.—In examining the petrous parts in the usual way, with the skull turned base upward, it is observed that in modern men of all races, in the majority of cases, these parts are more or less depressed below the niveau of the surrounding parts. In reality, of course, the surrounding parts have been pressed outward by the developing brain, while the prismatic and resistant petrous parts remained behind. The grade of depression of the petrous parts stands generally in close correlation with the size of the middle lacerated foramina and is of parallel significance.¹ Among the anthropoid apes even a slight depression of the petrous portions is very rare, and most frequently, especially in the orang, these portions rise slightly above the surrounding structures. In the African negro, and occasionally in individual skulls of other inferior races, they are level with the surrounding parts. In better developed negro skulls, as in the majority of those of other primitive peoples, they are slightly to moderately depressed. In white men, and in superior skulls in general, the depression is frequently pronounced, especially, it seems, in the brachycephals. The Indian stands in a practically intermediate position between superior whites and the negroes, and the Munsee are no exception. In two of the skulls the depression is well marked; in three males and seven females it is less than the average in whites; and in two males and five females it is only slight. The females, it will be noted, make a poorer showing in this respect than the males.

XXXVI. MUNSEE CRANIA: DEPRESSION OF PETROUS PORTIONS

	7 males		12 females	
	Cases	Per cent	Cases	Per cent
Medium (about as average in whites).....	2	29	.....	.....
Submedium.....	3	43	7	58
None or almost none.....	2	29	5	42

Pterygo-basal foramina. Posterior condylic foramina.—Interesting features of the base of the skull, to which Gruber and (in this country) Harrison Allen have called attention, are the foramina found occasionally at the base (or proximal part) of the external pterygoid plates. These foramina are seldom complete. They may be single, double, or even triple. They are formed by a process or by processes of bone which proceed upward and backward, and in some cases more or less outward, from the border of the external pterygoid plate. According to the insertion of these processes, the foramina to which

¹ See Hrdlička, Certain Racial Characteristics of the Base of the Skull, *Science*, 1901, p. 309; Proc. Assoc. Amer. Anatomists, 15th Sess., in *Amer. Jour. of Anatomy*, 1, 1901-2, pp. 508-9.

they give rise can be divided into two classes, namely, the more frequent pterygo-spinous and the rarer pterygo-sphenoidal.

Their significance is not yet so clearly understood as is desirable. They are of some anthropological interest and occur quite frequently among Indians, especially in certain localities. Among the Munsee they were rather scarce, particularly in the females.

XXXVII. MUNSEE CRANIA: PTERYGO-BASAL FORAMINA; POSTERIOR CONDYLIC FORAMINA

	7 males		12 females			5 males		12 females	
	Cases	Per cent	Cases	Per cent		Cases	Per cent	Cases	Per cent
None or only a trace..	3	43	11	92	Two, normal.....	3	60	12	100
Pterygo-spinous complete on left, fourths on right	1	14			Left absent.....	1	20		
Pterygo-spinous incomplete, both sides	1	14	1	8	Right, diminutive...	1	20		
Incomplete pterygo-sphenoidal, left side.	1	14							
Complete pterygo-sphenoidal on left (absent on right) ...	1	14							

Posterior condylic foramina.—These are canals which transmit the posterior condylic vein and are of interest only because of their more or less frequent absence from one or both sides in different racial groups. In the Munsee they are exceptionally normal, as will be seen from the preceding figures.

MISCELLANEOUS ANOMALIES

In addition to the peculiarities shown in the preceding paragraphs, the Munsee skulls present a number of anomalous conditions which deserve to be mentioned.

In male skull no. 285,306 the right occipital condyle is flat, the left being normal; there was no injury or arthritis.

In male skull no. 285,326 there is an accessory facet posteriorly to the left condyle.

In female skull no. 285,311 there are two moderate precondylar tubercles.

In male skull no. 285,313 and female skull no. 285,312 there is a moderate medio-basilar ("pharyngeal") fossa.

In female skull no. 285,320 the carotid canals in the petrous parts are usually large, measuring 7 mm. in major diameter.

In female skull no. 285,311 a canal, 6 by 4.5 mm., is present just posteriorly to the right angular process, in the frontal bone and the sphe-no-frontal suture.

Finally, there is a series of anomalies relating to the spinous and oval foramina. They are as follows:

Male skull no. 285,303: The median wall of the left foramina spinosum and ovale is deficient.

Female skull no. 285,310: Median wall of right spinous foramen deficient.

Female skull no. 285,347: Median wall of left spinous foramen deficient.

Female skull no. 285,320: Median wall of each spinous foramen deficient.

Female skull no. 285,323: Right foramina spinosum and ovale connected, and the median wall of both deficient.

Female skull no. 285,311: The left foramen ovale is unusually large, 8.5 by 4.5 mm., while the right is enormous, 10 by 8 mm. (pl. 21).

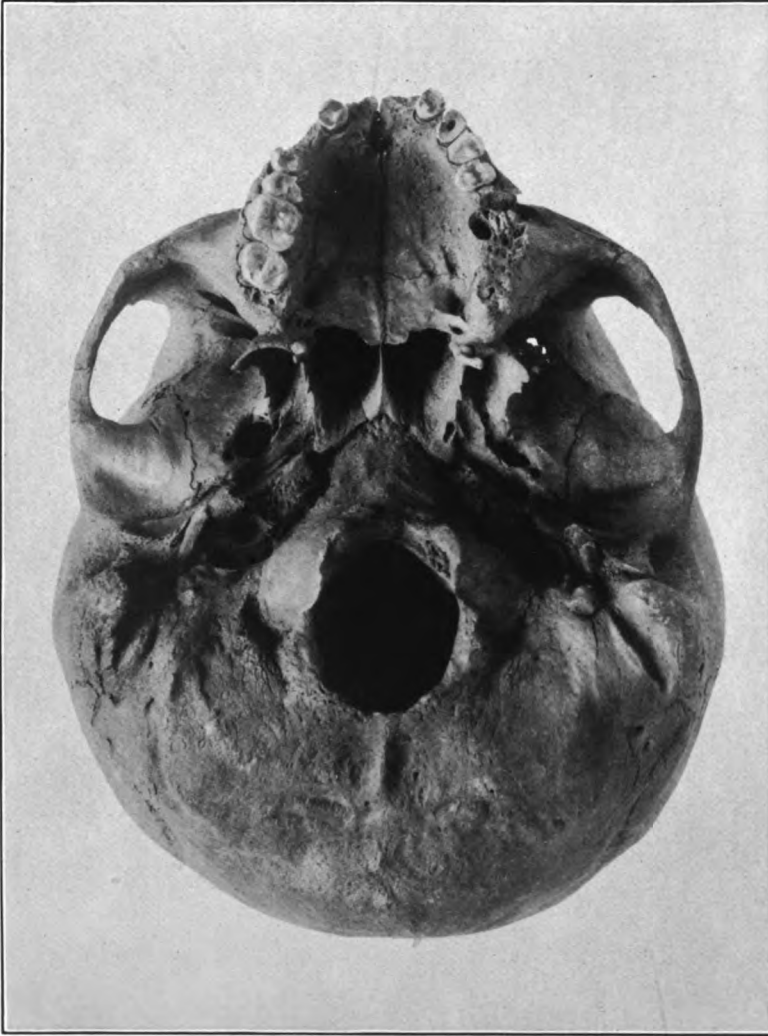
THE TEETH

Dentition.—Of the 22 skulls of Munsee adults at hand it is possible to ascertain the state of dentition in 14. In 11 of these cases there were 32 teeth in each, while in three there were 31. The congenital deficiency consisted in one case of the third left upper molar; in the second, the third left upper molar is completely absent, while the right corresponding tooth is rudimentary; and in the third there is a congenital absence of the left lower lateral incisor, while on the right side we find the very rare condition of a complete fusion of the lower lateral incisor and the canine (pl. 22).

Loss and decay.—Teeth lost through caries and the presence of decay are common in this series, more so than in other Indian groups. Among the males, 13 per cent of all the teeth were lost in life, while 12 per cent of those still present show more or less decay; among the females 21 per cent were lost in life and 16 per cent of those present show caries—this notwithstanding the fact that the average age of the female skulls was less than that of the males. The teeth lost or affected were mostly the molars, especially those in the lower jaw.

Wear.—In every instance the remaining teeth show more or less pronounced effects of wear. Where the wear is advanced, it is generally also irregular. The detailed notes show that the wear is slight in eight, moderate in five, and advanced in nine of the 22 specimens.

Size, quality, shovel-shaped incisors.—In size the Munsee teeth in all cases are medium. Where not decayed or worn off they show invariably regular and normal development. The upper incisors present in every case the cingulum which gives their lingual surface a more or less pronounced shovel-shaped character, common to and characteristic of all Indians, with rare individual exceptions.



BASE OF FEMALE SKULL NO. 285,311, U.S.N.M. (BRACHYCEPHALIC EXTRANEUS), FOUND AMONG THE MUNSEE BURIALS, SHOWING EXCESSIVE SIZE OF THE FORAMINA OVALE, ESPECIALLY ON THE RIGHT SIDE



LOWER JAW OF FEMALE MUNSEE SKULL NO. 285,307, U.S.N.M., SHOWING COMPLETE FUSION OF THE RIGHT LOWER LATERAL INCISOR AND CANINE

Anomalies.—The anomalies of the teeth are always of considerable interest, being mainly either reversive or degenerative (progressively) in character. The skulls observed indicate the following conditions:

Male no. 285,301: A small supernumerary tooth between and on the labial side of the left lower second and third molars. The lateral upper incisors in this skull are somewhat abnormal lingually, their surface appearing as if rolled together from side to side, so that the tooth is cylindrical in form and its shovel-like hollow has become almost a cavity.

In male no. 285,303: The third right upper molar is diminutive.

In male no. 285,305: The third lower right molar is impacted, its vertical axis tending forward and upward.

In male no. 285,326: The third right upper molar is diminutive.

In female no. 285,305 is present the aforementioned fusion of the right lower lateral incisor and canine. The resultant tooth appears like a broad stout incisor (pl. 22).

In female no. 285,310: The crown of the right lower third molar is unusually large (13.5 mm. long by 12 mm. broad) and looks like that of a fused double tooth, but both first and second molars are present. The opposite tooth is also larger than ordinary, but the upper corresponding teeth are normal.

Finally, in no. 285,311 the third right upper molar is rudimentary.

Cuspids.—Many of the molars present were so worn that a determination of their cuspid formulæ was impossible. The better preserved teeth showed the interesting conditions detailed in the following table:

XXXVIII. MUNSEE CRANIA: MOLARS; CUSPIDARY FORMULÆ

UPPER MOLARS

MALES

First molar			Second molar			Third molar		
Cusps	Number of teeth examined	Per cent	Cusps	Number of teeth examined	Per cent	Cusps	Number of teeth examined	Per cent
4	15	100	4	4	30	3 2/2	1	11
			* 3 1/2	7	54	2 2/2	3	33
			3	1	8	2 1/2	1	11
			2 3/2	1	8	† Pursed	4	44

* 1/2—one small cusp; 2/2—two small (or half) cusps, etc.

† Appearing like the mouth of a tightly drawn tobacco-pouch or purse.

17135°—Bull. 62—16—4

XXXVIII. MUNSEE CRANIA: MOLARS; CUSPIDARY FORMULÆ—Continued

UPPER MOLARS—Continued

FEMALES

First molar			Second molar			Third molar		
Cusps	Number of teeth examined	Per cent	Cusps	Number of teeth examined	Per cent	Cusps	Number of teeth examined	Per cent
4	14	100	3 1/2	13	100	3	2	15
						2 3/2	1	8
						2 2/2	1	8
						Pursed	9	69

LOWER MOLARS

MALES

5	4	100	5	1	33	5	2	50
			4 1/2	1	83	4 2/2	1	25
			4	1	33	4	1	25

FEMALES

5	1	100	4 1/2	2	67	4	4	67
			4	1	33	Pursed	2	33

It will be observed that the 29 first upper molars have all four regular cusps, while all the first lower molars have five. The second upper molars vary in the males, but show all three ordinary and one small cusp (the posterior lingual) in the females. The wisdom teeth fluctuate considerably in both sexes, both as to size and to form.

SUMMARY OF MEASUREMENTS AND OBSERVATIONS ON THE CRANIA

A summary of the results of the examination and measurements of the Munsee skulls includes the following points of interest:

A number of the specimens show traces of intentional fronto-occipital deformation, which is completely absent among other Indian tribes of the northeastern and Middle Atlantic States; and several of the skulls are of distinctly extraneous type. Both of these conditions point to admixture, which in all probability came from the southwestward and may have been due to Shawnee influence during the last few decades of the occupancy by the Munsee of the upper Delaware.

The crania that can be safely accepted as belonging to the Munsee themselves, and which are not deformed, are characterized by moderate dolichocephaly to mesocephaly and a high vault. They are not thick-walled and show fair capacity.

The face is of moderate dimensions and lacks prognathism. The facial index ranges from mild chamæprosopy to mild leptoprosopy.

The orbits are very variable, but the majority are mesoseme.

The nose is rather short, but fairly broad; the average index is mesorhinic.

The palate is of only moderate length, but fairly broad; its index in both sexes is brachyuranic.

The lower jaw is of moderate dimensions throughout.

The teeth are medium in size.

Descriptive features.—The forehead is chiefly of medium development in the males, in the females frequently somewhat low.

The sagittal region shows more or less arching, in no case extreme; the temporo-parietal region and the occiput present mostly medium forms.

Serration of cranial sutures is submedium to very submedium. Wormian and other intercalated bones are scarce. The order of occlusion of sutures among the males was S-C-TO-L; among the females TO-S-C-L (see page 35).

The pterions are all of the H type, with tendency to narrow in males, medium to broad in females.

Parietal foramina are few in number and small, retromastoid foramina moderate to small.

The mastoid processes and the supraorbital ridges present ordinary development and variation; no excess.

The nasion depression is well marked in the males, mostly shallow in the females; nasal bridge is medium to submedium, nasal bones of fair breadth; lower borders of the nasal aperture are mostly fairly sharp, and with one exception there are no simian grooves or subnasal fossæ; nasal spine ranges from very low to submedium.

The orbits show exceptional variation in form, as they do in measurements; suborbital (canine) fossæ are shallow to medium; malar bones are of but moderate development, without anomalies; zygomæ average somewhat submedium as compared with those of other Indians.

The upper alveolar arch is mostly of very moderate slant and free from abnormalities. The lower jaw is of ordinary form, without anomalies. The palate in half the cases is elliptic, in two-thirds of the remainder ovoid, and in one-third parabolic; it is in no case exceptionally low or very high, and there is no torus.

Base.—The glenoid fossæ in a majority of the crania show usual form and medium dimensions, but tend to widenness in a number of the females; dehiscences in the floor of the auditory meatus are, for Indians, scarce.

The styloid processes reach medium development in but few instances, and they are frequently rudimentary.

The middle lacerated foramina are mostly submedium to small; depression of petrous portions prevalently submedium to slight. The posterior lacerated or jugular foramina are, as usual, in a majority of the cases larger on the right side. Pterygo-basal foramina are scarce.

Anomalies observed on the skulls pertain mostly to the basal structures, particularly the condyles and the sphenoidal foramina.

Teeth.—Dentition was remarkably regular, but decay and loss of teeth in life were relatively more frequent than in other Indians; upper incisors, especially the middle, are shovel-shaped lingually, as usual in Indians. More or less wear of the teeth in the adults is present in every instance. Dental anomalies, while few in number, comprise a case of special interest: a perfect fusion of canine and incisor.

THE BONES

By reason of the care with which the bones were collected from the Minisink cemetery, those of the different adult skeletons were kept apart as found and are thus perfectly identifiable as to individuals. Excluding those of adolescents and children, there are present the bones of 32 adult skeletons, and in the majority of cases these are almost complete. Of these 32 individuals, 17 were male and 15 female, thus affording a fair series for comparison.

The bones in general are practically normal and almost free from important anomalies. They indicate people of medium to somewhat above medium stature, and of good though not excessive muscular development. In their morphological features they approximate in many respects the bones of whites, yet differ in numerous interesting particulars.

Although a number of the subjects represented by the skeletal remains were old people, there is an absence of light bones or of other evidences of senility. The proportion of such bones in modern whites is in fact much larger than among any of the Indians, either prehistoric or modern, a fact of considerable physiological importance.

HUMERUS

GENERAL OBSERVATIONS

There are present 46 adult humeri, mostly perfect and almost all paired. The principal measurements of these are given in the following table:

XXXIX. MUNSEE: HUMERI

MALES

Right					Left				
Number of adult humeri	Length, maximum	Diameters at middle*		Index of shaft (b×100) a	Number of adult humeri	Length, maximum	Diameters at middle*		Index of shaft (b×100) a
		Major (a)	Minor (b)				Major (a)	Minor (b)	
Average:	cm.	cm.	cm.		Average:	cm.	cm.	cm.	
Paired (13)...	32.5	2.24	1.65	73.6	Paired (13)...	32.6	2.2	1.64	74.6
Total present (14).....	32.5	2.25	1.65	73.4	Total present (13)...	32.6	2.2	1.64	74.6
Minimum:					Minimum:				
Total present (14).....	31.1	1.9	1.5	65.2	Total present (13)...	31.-	1.85	1.4	65.2
Maximum:					Maximum:				
Total present (14).....	34.4	2.6	1.85	81.6	Total present (13)...	34.7	2.55	1.95	81.4

FEMALES

Average:					Average:				
Paired (12)...	30.6	2.00	1.43	68.4	Paired (12)...	30.2	2.01	1.4	69.8
Total present (15).....	30.7	2.08	1.41	67.7	Total present (12)...	30.2	2.01	1.4	69.8
Minimum:					Minimum:				
Total present (15).....	28.5	1.9	1.2	61.9	Total present (12)...	28.5	1.75	1.25	63.6
Maximum:					Maximum:				
Total present (15).....	32.3	2.3	1.7	77.3	Total present (12)...	31.9	2.2	1.7	77.3

* Diameter major—parallel to the flat anterior surface; diameter minor—at a right angle to the preceding.

The averages are in no way exceptional. Reference to the writer's report on the Indian skeletal remains from Arkansas and Louisiana¹ will show that the humeri of that collection had practically the same dimensions.

The relation of the average of paired female humeri to that of paired male humeri is as 94.2 to 100, which is somewhat higher than existed among the Arkansas and Louisiana Indians (91.34 for 86 humeri), among Indians in general (91.2 for 602 humeri), and also among whites (91.8 for 2,700 humeri), but is lower than in the American negro (94.6 for 164 humeri). As no error in the sexual identification entered into the present series, the disparity here shown is difficult to explain, except perhaps by the result of some peculiar local occupational differences in the two sexes or a local hereditary multiplication of an individual peculiarity.

¹ *Jour. Acad. Nat. Sci. Phila.*, xiv, 1900, pp. 211-212.

The right and left humeri are of practically the same length in the males, while in the females the average of the left bones is slightly inferior to that of the right, as is usual in most Indian tribes and also among the white and other races. The equal length of the arm bones in the males indicates probably a lack of specialized occupation.

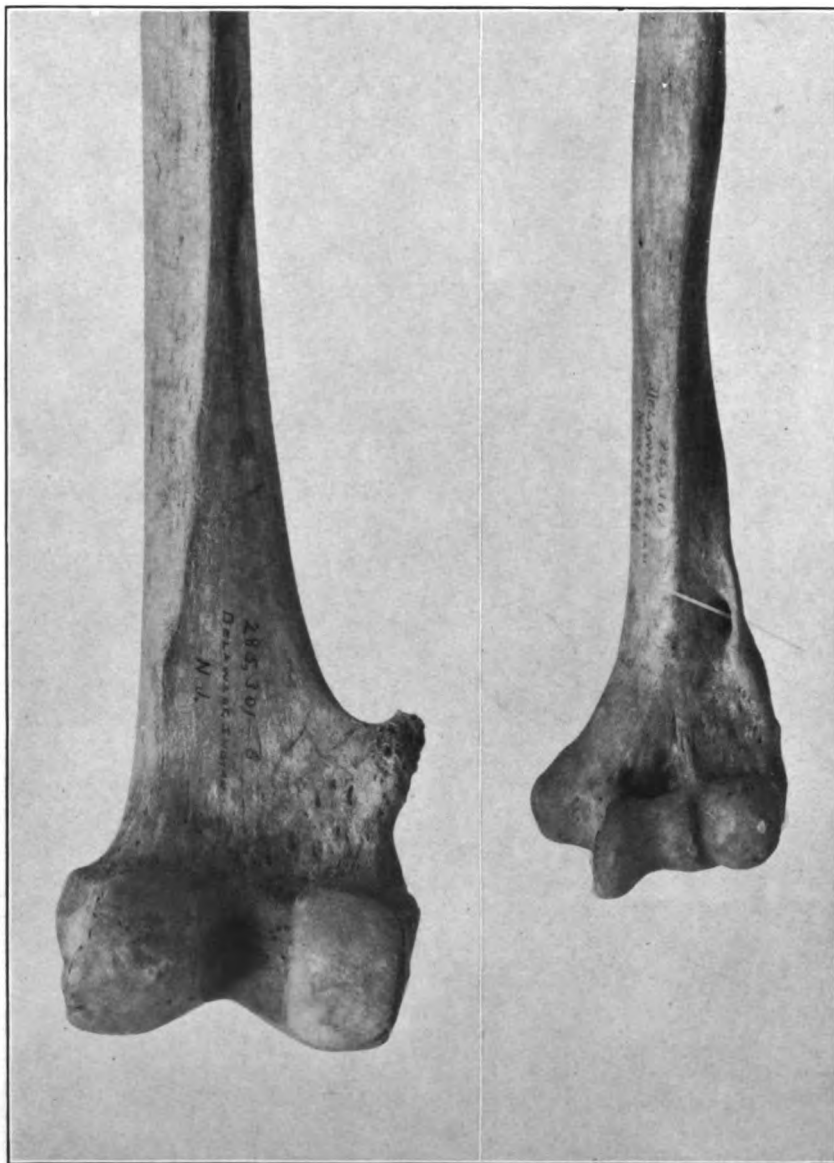
The dimensions of the shaft of the humerus at the middle and their percental relation or index are interesting in several respects, as shown by the following data:

XL. COMPARISON IN DIMENSIONS OF MUNSEE WITH OTHER RACIAL HUMERI

	Males				Females			
	Whites	American negroes	Munsee	Other Indians	Whites	American negroes	Munsee	Other Indians
Number of humeri (both sides).....	(1,930)	(112)	(26)	(348)	(770)	(52)	(24)	(254)
Length, cm.....	32.53	32.7	32.55	31.67	29.8	30.9	30.4	28.9
Mean diameter of shaft at middle, cm.....	2.02	2.09	1.85	1.91	1.83	1.89	1.78	1.69
Index of shaft.....	83	84.1	74.1	73.1	79.3	79.2	69.1	70.3

In the first place it will be seen that although the Munsee arm bones are practically of the same average length as those of the miscellaneous American whites, their strength in both sexes, and especially in the males, is greater in the whites. It will further be noted that the disproportion is especially pronounced in the thickness of the bone, the humerus of whites, both male and female, being the stouter, as a result of which the shaft index is decidedly higher in the whites than in the Indians—the Munsee humerus, in other words, is more platybrachic. Much the same distinction exists between the Munsee humeri and those of the American negro; while on the other hand it will be noted that in this respect there is close harmony between the Munsee and other Indians.

Referring again to the table on page 53, and contrasting the bones of the two sides, it will be observed that the left humerus in both sexes is on the average weaker, though the difference is quite small; also that the shaft index in both sexes is larger on the left side. Exactly the same conditions have been observed by the writer on the several series of arm bones of whites and negroes, and also on other Indians, as are presented in preceding tables, which fact shows that we are dealing with no accidental phenomena. The difference in the index between the two sides is due exclusively to the relatively greater breadth (i. e., the antero-posterior diameter) of the right bone, the thickness of the humerus being very nearly the same on the two sides of the body.



SUPRACONDYLOID PROCESS IN A FEMUR, AND A SPURIOUS SUPRACONDYLOID FORAMEN IN A HUMERUS OF THE MUNSEE

DETAILED OBSERVATIONS

Shape of the shaft.—A number of years ago the writer¹ called attention to the fact that in transverse sections at the middle the long-bones show each a considerable variety in the shape of the shaft, and that these varieties can be reduced for each bone to several distinct types of both functional and racial significance. As to the humeri, the most frequent shapes are the p. c., plano-convex or infantile form; type 1, or ordinary prismatic; type 2, lateral prismatic; and type 4, in which the anterior border is broadened out to a distinct fourth surface.

Among the Munsee the occurrence of shapes was as follows:

XLI. MUNSEE HUMERI: SHAPE OF SHAFT

Type	Male				Female			
	Right		Left		Right		Left	
	Specimens	Per cent	Specimens	Per cent	Specimens	Per cent	Specimens	Per cent
pc—plano-convex.....	3	21	2	15	2	13.3	3	23
1—ordinary prismatic or near	6	43	6	46	9	60	5	39
2—lateral prismatic.....	1	7	2	15	.....	.....	.....	.....
4—quadrilateral.....	2	14	.....	.....	2	13.3	3	23
Various intermediate.....	2	14	3	23	2	13.3	2	15

The most frequent shape is the ordinary prismatic; the next in frequency is the plano-convex; the lateral prismatic is the least common. The significance of these conditions must be left for future consideration, when our data, especially on the American Indians, are more extensive.

Perforation of the septum.—The septum between the olecranon and coronoid fossæ in Indians often shows a smaller or a larger perforation. The frequency of this developmental anomaly or condition differs from tribe to tribe, and it differs also between the sexes, being as a rule more common in females. In the Munsee male humeri only six instances of such perforation exist, three in right and three in left bones, the total amounting to 22 per cent of the bones. In only one instance is the opening large; in three it is medium; in one small, and in one of pin-point size. In the 29 female humeri which could be examined for this feature the conditions are quite different, the perforation being present in no fewer than 17 cases, or nearly 59 per cent of the bones. Eight of the 17 are right (47 per cent), nine left (53 per cent). As to size of the perforation, one is pin-point, eight small, and eight medium; none is large.

¹ Hrdlička, Typical Forms of Shaft of Long Bones, *Proceedings of the Association of American Anatomists*, 14th Sess., Dec. 1900, pp. 55-60, figs. 1-2, Washington, 1901.

Supracondylar process.—This process, which in a more or less rudimentary form, and especially in the form of a ridge, is not rare in whites, is very uncommon in the Indians, though even in this race in the majority of humeri some roughness, or even a slight ridge, can be detected in its position. Among the Munsee humeri no specimen shows more than a trace of the anomaly.

The rarity of this process in the Indian is of additional interest from the fact that it seems to be shared by other branches of the yellow-brown race, and also by the blacks; moreover, the process appears to be absent, or nearly so, in the humeri of all known apes. The problem as to why a feature of this nature, which appears clearly to be reversive, should be more common in modern whites than in the more primitive races and even in the anthropoid apes and the lower primates, offers a fruitful field for investigation.

RADIUS

The total number of radii in condition to be measured is 41, 19 male and 22 female. Taking the paired bones in the males, we find that their length is equal on the two sides, as was very nearly the case with the humeri; in the females the right radius averages slightly longer than the left, again as in the arm bones of this sex. The arms as a whole were therefore of very nearly the same length on the two sides in the males, but the right was generally slightly longer than the left in the females, a condition which in all probability was connected with the relatively greater use of the right hand and arm in the latter sex.

The percental relation between the length of the radius and that of the humerus approximates 79 on both sides in the males and 78 in the females. Indians of other localities show much the same condition, the index approximating in the males 78 on both sides and in the females 77 on both sides. In whites the same index is only 73.6 in the males and 72.8 in the females; while the American negro gave to the writer 77.4 for the male and 76.8 for the female sex. This means that the forearm in the Munsee and in Indians generally is relatively long; it is decidedly longer in relation to the humerus than in the whites, and so far as the Munsee are concerned it is even slightly longer than in the average American negro; and in all the groups it is to a slight extent relatively longer in the males than in the females.

In strength, curvature, and other features the Munsee radii show nothing exceptional. In fact, this bone is of secondary importance in the anthropology of modern races except in its relative proportions.

XLII. MUNSEE: RADIUS

MALES

Number of bones	Right			Left			
	Length, maximum	Number of cases	Radio-humeral index $\frac{R \times 100}{H}$	Number of bones	Length, maximum	Number of cases	Radio-humeral index $\frac{R \times 100}{H}$
Average:	cm.				cm.		
Paired (9).....	25.7	(8)	78.8	(9)	25.7	(8)	78.8
Total present (11).....	25.65	(10)	78.9	(9)	25.7	(8)	78.8
Minimum, total present (11).....	24.6	(10)	74.9	(9)	24.6	(8)	76.1
Maximum, total present (11).....	26.6	(10)	82.5	(9)	26.4	(8)	82.1

FEMALES

Average:							
Paired (10).....	23.7	(10)	77.5	(10)	23.45	(10)	78
Total present (11).....	23.66	(10)	77.5	(12)	23.54	(11)	78
Minimum, total present (11).....	22	(10)	74.8	(12)	21.6	(11)	74.7
Maximum, total present (11).....	24.7	(10)	80.1	(12)	24.6	(11)	80.1

ULNA

Like the radius, the Munsee ulna shows nothing specially noteworthy as regards its form. The curvature is moderate, as a rule, and so is the strength of the bone. The dimensions are presented in table XLIII.

As with the other two long-bones of the upper limb, the length of the ulna is practically the same on the two sides in the males, and slightly shorter on the left than on the right in the females.

XLIII. MUNSEE: ULNA

	Males				Females			
	Right		Left		Right		Left	
	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum
Average:		cm.		cm.		cm.		cm.
Paired.....	6	27.6	6	27.5	10	25.5	10	25.2
Total present.....	8	27.5	9	27.7	11	25.45	11	25.3
Minimum.....	8	26.6	9	26.1	11	23.7	11	23.4
Maximum.....	8	28.6	9	29.3	11	26.5	11	26.5

FEMUR

GENERAL OBSERVATIONS

The total number of adult femora in condition for measurement is 60—33 males, 27 females.

The bones, as a rule, are normally developed and with one exception free from anomalies. The exception is the left femur of male subject no. 285,301, which shows a large spinous process on the mesial border of the bone above the internal condyle (*proc. supracondyloideus femoris*), as exhibited in plate 23. The *linea-aspera*, while mostly well developed, is in no case exceptionally high. The curvature and torsion show nothing exceptional.

MEASUREMENTS

As this is the most important of the long-bones, a number of measurements besides the length were taken, as indicated below.

The mean bicondylar length of the Munsee femora, taking both sides together, is 45.5 cm. in the males and 42 cm. in the females. Judging from observations on whites and on other Indians, these lengths correspond to the average stature of approximately 167 cm. in the male and 156 cm. in the female Munsee. These figures are very close to those obtained by the help of the well-known Manouvrier and Rochet tables, and may therefore be safely accepted. They show that the Munsee were somewhat above the medium, but not really tall in stature.

XLIV. MUNSEE: FEMORA

MALES

	Right												
	Number of bones	Length bicondylar	Length maximum	Number of cases	Humero-Femoral Index $\frac{H \times 100}{F}$	Number of cases	Diameter antero-posterior at middle* (a)	Diameter lateral at middle† (b)	Index of shaft $\frac{b \times 100}{a}$	Number of cases	Diameters at upper flattening		Platymeric Index $\frac{d \times 100}{c}$
											Maximum (c)	Minimum (d)	
Average:		cm.	cm.			cm.	cm.			cm.	cm.		
Paired.....	12	45.2	45.8	8	71.8	16	2.92	2.55	87.1	15	3.23	2.37	73.3
Total present...	14	45.26	45.8	11	72.1	17	2.91	2.53	87.1	17	3.22	2.35	73.1
Minimum.....	14	43.4	43.8	11	69.6	17	2.5	2.2	73.5	17	2.9	2	64.6
Maximum.....	14	48.1	48.7	11	76.3	17	3.3	2.95	100	17	3.75	2.7	90
Left													
Average:													
Paired.....	12	45.4	45.9	8	71.7	16	2.9	2.61	89.9	15	3.33	2.38	71.6
Total present...	15	45.82	46.3	9	71.3	.....	.....	.....	.....	.....	.....	.....	.....
Minimum.....	15	43.7	44	9	67.7	16	2.5	2.25	75	15	2.9	2.1	59.5
Maximum.....	15	49.2	50	9	75.7	16	3.3	2.9	107.7	15	3.7	2.7	93.7

* Maximum.

† Linea aspera midway between the two branches of the compass.



FUSION OF HUMERUS AND ULNA; MALE MUNSEE SKELETON, NO.
285,303, U.S.N.M.

XLIV. MUNSEE: FEMORA—Continued

FEMALES

	Right												
	Number of bones	Length bicondylar	Length maximum	Number of cases	Humero-Femoral Index $\frac{H}{F} \times 100$	Number of cases	Diameter antero-posterior at middle * (a)	Diameter lateral at middle† (b)	Index of shaft $\frac{b \times 100}{a}$	Number of cases	Diameters at upper flattening		Platymetric Index $\frac{d \times 100}{c}$
											Maximum * (c)	Minimum (d)	
Average:		cm.	cm.				cm.	cm.			cm.	cm.	
Paired	13	42.1	42.65	10	72.6	13	2.58	2.35	91.2	12	2.88	2.17	75.5
Total present ..	14			12	72.7	14	2.56	2.37	91.6	14	2.89	2.14	74
Minimum	14	39.4	40	12	70.6	14	2.3	2	82.1	14	2.5	1.85	56.9
Maximum	14	44.7	45.1	12	74.4	14	2.95	2.6	106.2	14	3.25	2.45	84.5
	Left												
	Number of bones	Length bicondylar	Length maximum	Number of cases	Humero-Femoral Index $\frac{H}{F} \times 100$	Number of cases	Diameter antero-posterior at middle * (a)	Diameter lateral at middle† (b)	Index of shaft $\frac{b \times 100}{a}$	Number of cases	Diameters at upper flattening		Platymetric Index $\frac{d \times 100}{c}$
											Maximum * (c)	Minimum (d)	
Average:		cm.	cm.				cm.	cm.			cm.	cm.	
Paired	13	41.9	42.6	10	71.65	13	2.48	2.38	92.1	12	3.03	2.17	71.7
Total present ..	14			10									
Minimum	13	39.6	40	10	69.4	13	2.25	2	83.3	12	2.6	1.8	56.1
Maximum	13	44.5	45.4	10	73.2	13	3	2.65	113	12	3.35	2.45	87.7

* Maximum.

† Linea aspera midway between the two branches of the compass.

The two lengths of the femur, the bicondylar and the maximum, differ somewhat as a rule in favor of the latter. The difference is due and proportional to the inclination of the axis of the shaft and the development of the internal condyle, and ranges in different individuals from 0.5 mm. to 15 mm. In whites in all the groups studied it is moderate, not reaching 4 mm. in the average. In the American negro (who often has some white blood), the disproportion between the two lengths is slightly higher than in the whites, but additional observations are needed. Among Indians, however, the difference is perceptibly higher than among the whites, and is especially pronounced among the Munsee, where it reaches the average of nearly 5 mm. in the males (taking the mean of the two sides) and 6 mm. in the females. As the Munsee bones are perfectly normal, the explanation of this peculiarity must be sought either in an unusual breadth of the pelvis or in a somewhat greater length of the neck of the femur, and may be connected with some functional characteristic of these people, such as possibly a more than usual prevalence of the habit of squatting.

**XLV. MUNSEE AND OTHER FEMORA: RELATIONS BETWEEN THE BICONDYLAR
AND MAXIMUM LENGTH OF THE BONES**

	Munsee		Other Indians		United States whites		Italians		American negro	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Number of paired bones.....	12	12	55	22	100	50	31	8	12	8
Average excess of the maximum over the bicondylar length:										
Right, cm.....	5.35	5.6	4	3.8	3.05	3.78	3	2.6	4	3.2
Left, cm.....	4.2	6.45	4.2	3.2	2.55	3.8	2.58	2.1	3.25	3.5

The difference between the maximum and bicondylar length of the femur in some racial groups averages greater in the females than in the males, while in others the condition is reversed. Among the Munsee the females show the greater difference (6 mm. to slightly less than 5 mm. in the males); but this peculiarity is not shared by other Indian groups. A condition similar to that of the Munsee exists in this respect among the United States whites, where the difference between the two lengths averages 3.8 mm. in the females and only 2.8 mm. in the males; while among the Italians, and to a less extent the negroes, the disproportion is greater in the males (Italians: m. 2.8, f. 2.35 mm; negroes: m. 3.6, f. 3.35 mm.). The excess of the difference in males in these groups was unexpected, the usual impression being that the axis of the female femur is generally more oblique than that of the male; and the more oblique the axis, the greater should be the difference between the bicondylar and maximum length of the bone.

As to the two sides of the body, in the majority of the groups whose femora were studied, greater average differences were found between the two lengths of the bone on the right than on the left; in a few groups, however, such as the Munsee, the United States whites, and the United States negro females, the condition was reversed.

These interesting conditions and exceptions make it probable that an extended special study of the relations of the two femoral lengths would be well repaid by the results.

The relation in bicondylar length of the Munsee female to the male femora is as 92.7 to 100, and practically the same result was obtained in other Indians (92.65 to 100). In United States whites the proportion is as 93 to 100; in American negroes, as 93.1 to 100.

• These are striking similarities in people so far apart racially.

HUMERO-FEMORAL INDEX

The percental relation in length of the femur to the humerus in the Munsee, the humero-femoral index ($\frac{\text{maximum length of humerus} \times 100}{\text{bicondylar length of femur}}$), approximates in both sexes 72, which is very near the average in human races generally. The similarity of this important relation in different racial groups, as may be seen from the measurements by the writer in the next table, is quite remarkable.

As a rule the humero-femoral index is in both sexes slightly higher on the right than on the left side, and the Munsee form no exception in this particular. As to sex, while in all branches of the whites, as well as in the United States negroes, the male index on both sides is slightly higher, in the Munsee, as well as in other Indians, the index in the male is slightly lower than that in the female. These features are all connected, of course, with the peculiarities of the length of the Indian humerus as well as the femur, outlined in other chapters.

XLVI. HUMERO-FEMORAL INDEX IN THE MUNSEE AND IN OTHER RACIAL GROUPS

	Male			Female		
	Subjects	Right	Left	Subjects	Right	Left
Munsee.....	8	71.8	71.7	10	72.6	71.7
Other Indians.....	100	72.3	71.6	61	72.7	71.8
United States whites.....	200	72.2	71.7	63	71.8	70.9
Irish.....	22	72.6	71.9	35	71.7	70.6
Germans.....	86	72.8	72	21	72.4	71.3
Italians.....	39	72.5	72.3	11	72.6	72
Other whites.....	63	73.9	73	15	72.9	71.3
United States negroes.....	25	71.7	71.5	13	70.3	70.2

THE SHAFT

The measurements taken at the middle of the shaft in the Munsee femora indicate generally a moderate development. The mean diameter is smaller in both sexes than it is in ordinary American whites and negroes¹ of the same stature. The same condition, though in a somewhat lesser degree, was observable in the Arkansas and Louisiana Indian femora, and there are reasons to believe that it is common to other Indian tribes, if not general in the race. The whites and negroes used here for comparison are of course those of the working classes, or such as find their way into dissecting rooms.

As to the strength of the femur on the two sides of the body, the difference in the Munsee, as well as in other Indians and racial groups, is very small. However, in the males a slightly higher average mean diameter is seen in the left femur, while in the females the

¹ Males: Munsee, 2.74; United States whites, 2.9; United States negroes, 2.91 cm.
Females: Munsee, 2.54; United States whites, 2.66; United States negroes, 2.6 cm.

condition is reversed. Curiously the same slight excess in strength of the left femur in the male and of the right in the female is exhibited also by the United States whites, while in the United States negroes, in both sexes, the bones of the two sides are exactly equal, as is shown in the following table:

XLVII. STRENGTH OF THE FEMUR ON THE TWO SIDES OF THE BODY

MEAN DIAMETER AT THE MIDDLE OF THE SHAFT

	Munsee	United States whites	United States negroes
	cm.	cm.	cm.
Male:			
Right.....	2.73	2.89	2.91
Left.....	2.75	2.91	2.91
Female:			
Right.....	2.46	2.74	2.60
Left.....	2.43	2.64	2.60

Taking the antero-posterior and lateral diameters at the middle of the shaft separately, we find several more interesting points. The antero-posterior diameter in the Munsee (and the same is true of the United States whites and United States negroes, as will be seen by the following table) is practically equivalent in the right and left femora in the males; but except in the whites it is perceptibly smaller on the left side in the females of all groups. On the other hand, the lateral diameter, excepting in the probably too small male negro series, is invariably larger on the left than on the right side in both males and females. Thus it may be said that the left femur is almost invariably slightly broader on the average than the right, and this especially in the females of probably all racial groups.

These interesting conditions are most clearly shown by the shaft index ($\frac{\text{diameter lateral} \times 100}{\text{diameter antero-posterior}}$), which in both sexes and in all the racial subdivisions is higher on the left side.

The index in the Munsee femora is noteworthy in another respect: It is decidedly smaller in both sexes of this group than it is in the American negro and especially in the United States whites. Judging from data on other Indians in the writer's possession, it seems very probable that the characteristic shown by the Munsee in this regard is common to Indians in general. As may be seen by reference to the figures in the following table, the low shaft index in the Munsee is due entirely to smaller breadth; the Munsee femur is relatively narrower than that of both whites and negroes.

XLVIII. COMPARISON OF THE PROPORTIONS AND INDEX OF THE SHAFT OF THE FEMUR AT MIDDLE, IN MUNSEE, WHITES, AND NEGROES. PAIRED BONES

MALES

	Right			Left		
	Diameter antero-posterior	Diameter lateral	Index	Diameter antero-posterior	Diameter lateral	Index
Munsee:	cm.	cm.		cm.	cm.	
Specimens.....	(16)	(16)	(16)	(16)	(16)	(16)
Average.....	2.92	2.55	87.1	2.90	2.61	88.9
United States whites:						
Specimens.....	(66)	(66)	(66)	(66)	(66)	(66)
Average.....	2.95	2.84	90.3	2.95	2.87	97.4
United States negroes:						
Specimens.....	(6)	(6)	(6)	(6)	(6)	(6)
Average.....	3.06	2.77	90.5	3.06	2.77	90.5

FEMALES

Munsee:						
Specimens.....	(13)	(13)	(13)	(13)	(13)	(13)
Average.....	2.58	2.35	91.3	2.48	2.38	93.1
United States whites:						
Specimens.....	(28)	(28)	(28)	(28)	(28)	(28)
Average.....	2.64	2.58	97.7	2.65	2.63	99.5
United States negroes:						
Specimens.....	(7)	(7)	(7)	(7)	(7)	(7)
Average.....	2.68	2.53	94.4	2.63	2.58	96.1

PLATYMERY

Another anthropologically important region of the femur is the subtrochanteric flattening, which, as well known, has been studied in whites and in other races by Manouvrier and other observers.¹ The flattening in question is situated below the minor trochanter, reaching its maximum at approximately 3 cm. below that point. It yields itself to two measurements, the maximum and the minimum diameter, and the percental relation of the latter to the former constitutes the platymeric index. This index is generally quite high in whites, in whom the flattening is but moderate.

The next table shows the conditions found in this respect with regard to the Munsee, the United States whites, and the United States negroes.

¹ See Hrdlička, Report on Additional Skeletal Remains from Arkansas and Louisiana, *Jour. Acad. Nat. Sci. Phila.*, xiv, 1909, pp. 215-216.

XLIX. COMPARISON OF THE PROPORTIONS AND INDEX OF THE SHAFT OF THE FEMUR AT THE SUBTROCHANTERIC FLATTENING, IN THE MUNSEE, WHITES, AND NEGROES. PAIRED BONES

MALES

	Right			Left		
	Diameter maxi- mum	Diameter mini- mum	Index	Diameter maxi- mum	Diameter mini- mum	Index
Munsee:	<i>cm.</i>	<i>cm.</i>		<i>cm.</i>	<i>cm.</i>	
Specimens.....	(15)	(15)	(15)	(15)	(15)	(15)
Average.....	3.23	2.37	73.3	3.33	2.38	71.6
United States whites:						
Specimens.....	(66)	(66)	(66)	(66)	(66)	(66)
Average.....	3.25	2.60	82.8	3.24	2.73	84.1
United States negroes:						
Specimens.....	(6)	(6)	(6)	(6)	(6)	(6)
Average.....	3.07	2.68	87.3	3.17	2.73	88.3

FEMALES

Munsee:						
Specimens.....	(12)	(12)	(12)	(12)	(12)	(12)
Average.....	2.88	2.17	76.5	3.03	2.17	71.7
United States whites:						
Specimens.....	(28)	(28)	(28)	(28)	(28)	(28)
Average.....	2.94	2.39	81.1	3.0	2.39	79.6
United States negroes:						
Specimens.....	(7)	(7)	(7)	(7)	(7)	(7)
Average.....	3.02	2.42	80.1	2.97	2.44	82

It will be observed, in the first place, that at the middle of the shaft the mean of the two diameters at the upper flattening in the Munsee is smaller in both sexes and on both sides than that in either the whites or the negroes, thus indicating that the bone is more slender.

The most striking points brought out by the data are, however, those relating to the degree of the flattening in the subtrochanteric region in the different racial groups. The Munsee femora are decidedly flatter than those of the whites, which in turn are slightly flatter than those of the negro. As a result the platymetric index in the Munsee is considerably below that in both the other races.

Taking the two diameters separately it will be observed that the diameter maximum or breadth is frequently larger in the left than in the right femur. This is true in both sexes among the Munsee and in the white females and negro males. In the white males the measurement is equal on the two sides, and in the negro females it is slightly larger on the right than on the left. In all probability the tendency of the left femur to be slightly broader than the right at the subtrochanteric flattening is quite universal.

The lateral diameter or thickness is also slightly larger in the left femur in nearly all the racial and sex groups, but the excess is less than with the breadth. It is thus evident that the left femur at this point is in general slightly stronger than the right. But, as already indicated, the mean excess in breadth is mostly greater than that in thickness, the result of which in most of the groups is a slightly lower platymeric index on the left side.

As to sexes, the platymeric index in the Munsee is slightly higher on both sides in the females than in the males. This is exceptional for Indians, the condition being usually the reverse. In the United States whites and United States negroes, and in Indian tribes other than the Munsee examined by the writer, the male femur as a rule gives a somewhat higher average index on both sides than the female, indicating that the flattening in the male is of lesser degree.

As to the sides, in the majority of the groups, and particularly in the Munsee, the right platymeric index is slightly higher than the left. In the Arkansas and Louisiana Indians it was very nearly equal on the two sides in both sexes. In the series of United States white males used here for comparison, and in the United States negro females, the right index is higher. Evidently, while the preponderant tendency is for the right platymeric index to be slightly higher than the left, there are not infrequent exceptions, but the differences are not of much importance.

To summarize, it may be stated that at the subtrochanteric flattening the Munsee femur shows a decidedly greater compression than the femora of the United States whites, and especially those of United States negroes; it shows a slightly greater relative flatness in the male than in the female, which is exceptional; and in the majority of cases it is relatively slightly flatter on the left than on the right side of the body.

These details may seem rather involved, and perhaps in some instances of no great consequence. But when at some time we shall be able to examine scores of records where we have now but few, and each series of records extending to hundreds instead of to only tens of specimens, the above points will assume a definite morphological importance, demonstrating on the one side the presence of astonishingly uniform and persistent laws relating even to secondary characteristics of bones, and, on the other, to clear, conspicuous, racial sexual and other group differences.

SPECIAL CHARACTERISTICS OF THE FEMORA

As to special descriptive characteristics of the Munsee femora, special attention was paid to the *linea aspera*, the shape of the shaft at middle, and the presence and development of the third trochanter.

Linea aspera.—The linea aspera was found to be generally well developed, but seldom high and in no case excessively rough, indicating well but not exceptionally developed musculature.

Shape of the shaft.—As to the shape of the shaft at middle, in a fourth of the males and in nearly half the females this was found to be more or less prismatic, and in 9 per cent of the males and 7.5 per cent of the females, plano-convex; the remainder of the bones showing, with one exception, intermediary or not well-defined shapes. None of the femora present the cylindrical (juvenile) type, or type 4 (anterior surface divided in two by a long vertical ridge), and in but one bone is the shape clearly elliptical. Among the whites the last named (elliptical) form is much more common, while the plano-convex type is less frequent than in the Indians.¹

Third trochanter.—Respecting the third trochanter, this presents itself as a more or less marked ridge, or an oblong tuberosity, or a round tuberosity; and in any of these forms it may be slight, medium, or pronounced. In some instances there will be found a depression, instead of an elevation, in the bone at or near this locality. These different forms have no separate morphological significance. They all serve for or are due to the attachment of the gluteus maximus muscle, and merge into each other by transitional stages. In the Munsee, conditions in regard to the third trochanter were as follows:

L. MUNSEE AND WHITE FEMORA: THIRD TROCHANTER OR GLUTEAL TUBEROSITY

	Subjects	Third trochanter absent	Ridge		Oblong tuberosity		Round tuberosity	
			Moderate	Pronounced	Moderate	Pronounced	Moderate	Pronounced
Munsee:		Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Male.....	(17)	30	40	.....	26	.....	6	.....
Female.....	(14)	32	36	.....	22	3.5	3.5	3.5
Whites:								
Male.....	(200)	43	32	4.5	9	5	3.5	3
Female.....	(120)	45	31	5	12.5	1.7	5	.....

It is here seen that the third trochanter is strictly absent in less than a third of the male as well as of the female bones of the Munsee; a small to pronounced oblong tuberosity exists in 26 per cent of the males, and practically the same proportion (25.5 per cent) of the females, while a rounded tuberosity is found in 6 per cent of the males and in 7 per cent of the females. Among the previously reported Arkansas and Louisiana Indian femora, the frequency of the third trochanter in most of its forms was somewhat greater. Among the ordinary American whites, it will be observed from the above figures, there is in both sexes a more frequent complete absence of the third

¹ Compare *Arkansas and Louisiana Femora*, op. cit., p. 217.

trochanter in any form than in the Munsee; there is less frequency of the moderate ridge and moderate oblong tuberosity; and a greater frequency of pronounced grades of both ridge and oblong tuberosity, while the occurrence of round tuberosity is about even in the two groups. Subtrochanteric fossa in place of or beside a prominence was observed in Munsee adults in five cases—four males and one female. In adolescents it was more frequent.

TIBIA

The results of the several measurements obtained on the Munsee tibiae are shown below.

The mean length of the bone, taking the two sides together, is 38.5 cm. in the males and 35.3 cm. in the females. The length of the female bone stands to that of the male as 91.7 to 100, which is lower than was obtained on the tibiae from Louisiana, where the proportion was 93.7, or than that prevailing among whites, where it is even slightly higher (94.6 in miscellaneous New York whites). The Munsee female tibiae are therefore relatively somewhat short, paralleling to some extent what was found with reference to the radius. Lesser differences of the same nature is found in probably all larger racial groups. Why the feature should be more pronounced in the Munsee than in other Indians is difficult of explanation; but, as will be seen later, this is not the only peculiarity of the female Munsee tibiae.

LI. MUNSEE: TIBIAE

MALES

	Right						
	Number of bones	Length *	Number of cases	Diameter † antero-posterior at middle	Diameter † lateral at middle	Index of shaft at middle $\frac{b \times 100}{a}$	Tibio-femoral index $\frac{T \times 100}{F}$
				(a)	(b)		
Average:		cm.		cm.	cm.		
Paired.....	(11)	38.3	(14)	3.28	2.14	65.4	(19) 84.4
Total present.....	(12)	38.5	(14)	3.28	2.14	65.4	(10) 84.6
Minimum.....	(12)	36	(14)	3.05	1.95	56.3	(10) 81.1
Maximum.....	(12)	40.5	(14)	3.55	2.4	60.7	(10) 86.9
	Left						
	Number of bones	Length *	Number of cases	Diameter † antero-posterior at middle	Diameter † lateral at middle	Index of shaft at middle $\frac{b \times 100}{a}$	Tibio-femoral index $\frac{T \times 100}{F}$
				(a)	(b)		
Average:		cm.		cm.	cm.		
Paired.....	(11)	38.6	(14)	3.25	2.16	66.6	(9) 84.5
Total present.....	(12)	38.8	(15)	3.23	2.16	67.1	(11) 84.9
Minimum.....	(12)	36.7	(15)	2.8	1.95	54.9	(11) 79.4
Maximum.....	(12)	40.9	(15)	3.55	2.4	80.4	(14) 90.0

* On Broca's *planche ostéométrique*, with the spine in the opening of the vertical portion of the instrument and the condyles applied to the board on both sides of the opening, the rest of the bone lying immobile on the horizontal board.

† Maximum.

‡ With anterior border of the bone midway between the two branches of the compass that are applied to the sides of the bone.

LI. MUNSEE: TIBIÆ—Continued

FEMALES

	Right						
	Number of bones	Length	Number of cases	Diameter antero-posterior at middle	Diameter lateral at middle	Index of shaft at middle $\frac{b \times 100}{a}$	Tibio-femoral index $\frac{T \times 100}{F}$
				(a)	(b)		
Average:		cm.		cm.	cm.		
Paired.....	(13)	35.3	(13)	2.6	1.98	76.1	83.7
Total present.....	(14)	35.3	(13)	2.6	1.98	76.1	83.7
Minimum.....	(13)	32.4	(13)	2.25	1.65	70.2	81.4
Maximum.....	(13)	37.1	(13)	2.85	2.3	86.7	87.7
	Left						
	Number of bones	Length	Number of cases	Diameter antero-posterior at middle	Diameter lateral at middle	Index of shaft at middle $\frac{b \times 100}{a}$	Tibio-femoral index $\frac{T \times 100}{F}$
				(a)	(b)		
Average:		cm.		cm.	cm.		
Paired.....	(13)	35.2	(13)	2.6	1.93	74.5	83.7
Total present.....	(14)	35.2	(14)	2.64	1.96	74.6	83.7
Minimum.....	(14)	32.4	(14)	2.25	1.5	58.8	81.5
Maximum.....	(14)	36.7	(14)	2.8	2.35	82.2	86.1

As to the two sides, the Munsee left tibia averages somewhat longer in the males than the right, which on the whole in slight measure is also the condition among the whites, but to which individual and even group exceptions are not infrequent. In the Munsee females, on the other hand, the average length of the left tibia is slightly less (by 1 mm.) than that of the right.

The percental relation of the length of the tibia with the bicondylar length of the femur, or the *tibio-femoral index*, averages in whites approximately 82 in the males and slightly less in the females. In the Munsee it is somewhat more elevated in both sexes. As in the whites and other racial groups, a moderate excess of the male over the female index is present on both sides, indicating the slightly greater relative shortness of the female leg bones aforementioned. Judging from the available data on the tibio-femoral index among other Indians,¹ that in the Munsee comes very near to the average of the race.

The strength of the Munsee tibia (and the same is probably true of many other Indian tribes) is surprising, being nearer that of the whites than is the case with either the humerus or the femur. The antero-posterior diameter of the Indian tibia is, in fact, in almost all the Indian groups somewhat greater than in the whites. The index of the shaft is invariably and quite perceptibly lower in the Indians

¹ Compare S. Bello y Rodriguez, *Le fémur et le tibia, chez l'homme et les anthropoïdes*, Thèse, Paris, 1909, p. 109.

than in the whites, excepting the Munsee females, in whom, curiously enough, the index is relatively quite high, exceeding both that of the other Indians available for comparison and of the whites. No satisfactory explanation of this and other exceptional features of the Munsee tibia can be given. The condition can scarcely be regarded as accidental, for on examining the individual shaft indexes it is observed that in but one of the female bones is the index below 60, giving thus a pronounced platynemy; in five it is between 60 and 70; in ten between 70 and 80, and in no fewer than eleven it rises to 80 or over. Among the twenty-nine male Munsee tibiæ there is but one that gives a shaft index of slightly above 80.

LII. MEAN DIMENSIONS OF THE TIBIA (THE TWO SIDES BEING TAKEN TOGETHER) IN THE MUNSEE AND OTHER INDIANS, AND IN WHITES

	Length	Mean diameter antero-posterior at middle* (a)	Mean diameter lateral at middle* (b)	Module †	Index of shaft at middle $\frac{b \times 100}{a}$	Tibio-femoral index $\frac{T \times 100}{F}$
Males:	cm.	cm.	cm.	cm.		
Munsee.....	38.45	3.27	2.15	2.71	66	84.45
Arkansas.....	38.4	3.35	2.18	2.76	65.15	82.35
Louisiana.....	37.1	3.3	2.2	2.75	68.47	84.25
Whites (miscellaneous).....	36.5	3.14	2.22	2.68	71.1	82
Females:						
Munsee.....	35.25	2.6	1.96	2.28	75.3	83.7
Arkansas.....	33.15	2.8	1.96	2.39	69.25	82.35
Louisiana.....	34.75	2.9	1.88	2.39	64.2	83.9
Whites (miscellaneous).....	34.56	2.65	1.96	2.3	71.9	81.6

* Right + left
2

† Diameter antero-posterior + diameter lateral, right and left.
4

The Munsee tibiæ, barring a few moderate inflammatory lesions referred to in another section, are normal throughout and free from anomalies. The inclination of the head is in no case especially marked.

As to the shape of the shaft at middle, conditions were found as follows:

LIII. MUNSEE TIBIÆ: SHAPE OF SHAFT AT MIDDLE*

	1	2	3	4	5	6	I
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Males.....	11	13.5	7	24	3.5	.....	41
Females.....	44	11	.....	15	3.5	.....	26

* 1—ordinary prismatic; 2—lateral prismatic; 3—external surface concave; 4—posterior surface divided into two by vertical ridge; 5—interior border indistinct, posterior half of bone oval; 6—plano-convex; I—indefinite.

It is interesting to note that in the female Munsee tibia, type 1 is decidedly frequent and much more common than in the males; type 3, which is usually associated with considerably developed leg muscles, is absent in the females; type 4 is relatively frequent in both sexes; type 6 is wholly absent.

In the next table are shown for comparison the proportions of the different types found by the author in different racial groups. For the purpose of elucidating these data, both sexes are taken together. It is seen that well-differentiated type 1 is most common in the Indians; that type 2 is relatively scarce in the negro; type 3, most common in the white (laboring class), was not met with in a pronounced form in the negro; type 4 is decidedly more common in the Indian than in the other two races; and type 6, absent in the Indians and rare in the whites, is fairly frequent in the negro. These differences show that the shape of the shaft of the tibia, as that of the femur, humerus, and other bones, has a considerable racial significance, which, as our data are increased, will doubtless become accentuated.

LIV. COMPARISON OF MUNSEE AND OTHER INDIAN WITH WHITE AND NEGRO TIBIÆ WITH REFERENCE TO SHAPE OF SHAFT AT MIDDLE*

Types	1	2	3	4	5	6	I
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Munsee (all—56).....	27	12	3.5	20	3.5	.....	34
Arkansas and Louisiana.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous whites (1975).....	18	15	9	5	5	2	45
United States negroes (55).....	20	9	.....	7	7	11	45

* For the significance of the denominations see the note to the preceding table.

FIBULA

While of secondary importance, the fibula often presents interesting features which make it worthy of closer attention than it usually receives. One of these features concerns its length on the two sides of the body, which, in some Indians at least, is more uniform than that of its companion bone, the tibia. It was found so by the writer in the skeletal collections from Arkansas and Louisiana mounds, and the feature appears again in the Munsee. The slight differences presented by the Munsee fibulæ in this particular harmonize with those of the tibiæ.

The percental relation of the female to the male fibula averages 93.5 (the male bone = 100), while in the tibia it was only as 91.7 to 100.¹ This anomaly is due to the unexplained relative shortness of the female Munsee tibiæ.

¹ Taking only cases where all four bones of one body are available for measurement, we obtain 92 for the relation of female to male tibiæ and 94.6 for that of the fibulæ, numbers which stand to each other very much as do those above given.

As to the shape of the shaft, which in the fibula differs more than in any other bone, the prevalent tendency, as in the Arkansas and Louisiana specimens, is toward type 2, or the lateral prismatic; a good many of the bones, however, show also a more or less marked fluting of one or two of the surfaces. The details are given in the following table:

LV. MUNSEE FIBULA: LENGTH

	Males				Females			
	Right		Left		Right		Left	
	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum
Average:		cm.		cm.		cm.		cm.
Paired.....	(5)	34.9	(5)	37	(4)	34.9	(4)	34.8
All.....	(6)	37.1	(6)	37.1	(9)	34.7	(7)	34.7
Minima.....	(6)	35.3	(6)	35.8	(9)	32	(7)	31.8
Maxima.....	(6)	39	(6)	38.8	(9)	36.8	(7)	36.9

LVI. MUNSEE AND OTHER INDIAN FIBULÆ—SHAPE OF SHAFT AT MIDDLE*

Types ¹	Males						Females					
	1	2 and 2a	3	5	6	4	1	2	3	5	6	4
	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
Munsee.....	4	48	4	15	11	18	5	32	18	5	14	27
Arkansas and Louisiana....	27	40	9	9	3	12	17	42	4	4	17	17

*1=Ordinary quadrilateral, approaching prismatic; anterior surface nearly absent to moderate; posterior surface facing directly backward or nearly so. 2=Lateral prismatic; posterior surface facing backward and inward; medial surface much less in area than lateral; anterior surface narrow to broad. 2a=Relation between medial and lateral surface reversed, the latter being the narrower. 3=Medial surface fluted. 4=Lateral surface differentiated into two surfaces. 5=Lateral surface fluted. 6=Both medial and lateral surfaces fluted.

CLAVICLE

The Munsee clavicle, in paired bones and in average, measures 15.3 cm. in length on the right and 15.25 cm. on the left in the males, and 13.7 cm. on the right with 13.9 cm. on the left in the females. This gives the ratio of 90.4 (female) to 100 (male), which is lower than that in any of the long-bones and indicates a relative shortness of the clavicle in the Munsee females.

The right clavicle is very slightly longer than the left in the male, but is perceptibly shorter than the left in the female skeletons. One pair of the male and a pair of the female bones show pronounced curves; otherwise there is nothing special. The strength of the bones is moderate to medium; none is massive.

LVII. MUNSEE CLAVICLE: LENGTH

	Males				Females			
	Right		Left		Right		Left	
	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum	Number of bones	Length, maximum
Average:		cm.		cm.		cm.		cm.
Paired	(8)	15.35	(8)	15.3	(9)	13.7	(9)	13.9
All	(9)	15.4	(10)	15.3	(11)	13.8	.....	.....
Minima	(9)	14.4	(10)	14.2	(11)	12.7	(9)	12.9
Maxima	(9)	16.5	(10)	16.3	(11)	14.9	(9)	15.6

STERNUM

The total number of sterna present is 14, 8 males and 6 females. In 13 of these specimens the manubrium is completely detached, which in general is the most usual condition, while in the 14th there is partial attachment. Much the same condition was found by the writer in the Indian sterna from Arkansas and Louisiana.

The measurements of the sternum, given in the next table, are found to be moderate throughout. Unfortunately there are few available measurements of the sternum in other races for comparison.

LVIII. MUNSEE STERNUM: DIMENSIONS

MALES

	Number of bones	Total length (less xiphoid and episternals)* (a)	Greatest breadth of body (b)	Sternal Index $\frac{b \times 100}{a}$	Maximum thickness of body
Average:		cm.	cm.		cm.
Paired	(6)	15.7	3.7	23.3	1.3
All		15.7	3.7	23.3	1.2
Minima	All	14.6	3.4	21.1	1
Maxima	All	17.5	4.2	25.8	1.3

FEMALES

Average:					
Paired	(6)	13.8	3.5	25.7	0.9
Average	All	13.8	3.5	25.7	0.9
Minima	All	12.8	2.8	21.5	0.8
Maxima	All	16.2	3.9	30.5	1

* Where present and attached to upper sternal tubercle (three instances).

As to the rib facets, two of the 11 sterna in which the notches can be counted show seven on each side; in female skeleton no. 285,307, with normal number of ribs, there are seven notches on the right and but six on the left; in female no. 285,311, with 24 regular ribs

and a right cervical, there are six facets on the right and seven on the left, and all the facets on the right side are situated perceptibly higher than those on the opposite side of the bone; in four instances there are six facets on each side; in two (male no. 285,301 and female no. 285,330, the former with the normal number of ribs and the latter uncertain) the sternum shows six facets on the right and but five on the left side; finally, in female no. 285,310, with 24 ribs, we find but five sternal facets on each side—this subject, however, was not fully adult. These details show that there are considerable irregularities in the sternal facets among the Munsee, even in the presence of the normal number of ribs.

The antero-posterior curvature of the Munsee sternum ranges from slight to moderate. The xiphoid appendix is attached to the body of the sternum in only one instance—a male. In one male (no. 285,314) the left clavicular facet is considerably larger than the right.

Three of the male and one female sterna show on one or both sides attached episternal tubercles. In three of the cases the anomaly is unilateral—twice left and once right—while in one of the males it is bilateral, but the tubercle is more pronounced on the left.

The breadth-length index of the sternum shows considerable individual variation in both sexes, but on the average it is higher in the females, the bone in this sex being relatively shorter.

SCAPULA

GENERAL FEATURES

This is one of the most interesting bones of the body, and although it has been reported on by a number of observers, it presents a variety of features that deserve further study. It is a bone which in all particulars shows great individual variation, but on close scrutiny it is found that these variations differ more or less from group to group and are therefore of anthropological importance, and that they are subject to certain laws which evidently are universal to human kind.

In collections derived from graves, such as those of the Munsee, the scapulæ, on account of their frailness, are often damaged, so that relatively few specimens are available for examination. There are nevertheless in the Munsee collection five male and nine female bones in fair condition, and their study gives some satisfactory results. To contrast these results properly the writer presents in the following table data not only of the Munsee, but also those on several other Indian groups as well as on the whites and the United States negroes.

LIX. MUNSEE SCAPULÆ: COMPARISON

	Specimens	Total height	Infra-spinous height	Breadth	Scapular index	Infra-spinous index
MALES						
Munsee.....	(4)	cm. 15.2	cm. 11.2	cm. 10.6	69.5	94.2
Southern Utah cliff-dwellers.....	(18)	15.1	11.6	10.15	67.4	87.7
Pima and Pueblo.....	(5)	15.5	12	11.05	71	93
Various Mexican Indians.....	(9)	15.8	12	10.4	65.5	86.6
Indians, Peru.....	(55)	15.83	12	10.17	64.2	84.8
Indians, Peru (Livon) ¹	(17)	15.1	11.3	10	63.8	85.6
United States whites (various nationalities).....	(70)	16.4	12.25	10.7	65.3	87.3
Whites (Livon) ¹	(73)	16.8	12.4	10.6	63	85.5
United States negroes.....	(46)	16.25	11.6	10.9	66.8	92.1
FEMALES						
Munsee.....	(9)	13.9	10.4	9.9	70.7	95.3
Southern Utah cliff-dwellers.....	(10)	13.7	10.25	9.7	70.6	94.2
Pima and Pueblo.....	(5)	13.8	10.25	9.95	72	97
Various Mexican Indians.....	(12)	13.75	10.25	9.75	70.7	94.9
Mexican Indians ² (Livon) ¹	(2)	13.17	10.16	10.17	77.2	100
Indians, Peru.....	(39)	13.78	10.47	9.17	66.5	87.5
Indians, Peru (Livon) ¹	(6)	13.5	10	9	67	88.4
United States whites (various nationalities).....	(44)	14.4	10.9	9.6	66.7	88.4
Whites (Livon) ¹	³ (51)	(13.5)	(10.25)	(9.1)	67.5	88.8
United States negroes.....	(18)	14.2	10.2	9.25	65	90.7

¹ M. Livon, *De l'omoplate, etc.*, Thèse, Paris, 1879, pp. 41-42.² One subject.³ The averages of the measurements are exceptionally small in this series.

The above data show that the Indian scapula is on the whole somewhat smaller than that of either the whites or the American negroes, except in the females, where the bone, while shorter, is slightly broader than that in the other two races. The Munsee scapulæ compare fairly well with those of other Indian tribes, the apparent differences being doubtless due in a measure to the small number of specimens.

The scapular index in the Munsee is high, indicating that the shortness of the bone is both absolute and relative. The different Indian tribes offer considerable variation in this respect, but, as will be noted, except in the Peruvians, the index in all is above that of the whites and in the majority of cases even above that of the negroes. These high scapular indexes in the Indian approximate those of the anthropoid apes, but it remains to be determined if the phenomenon in the two genera is homologous.

In the female Munsee the scapular index is perceptibly higher than in the males, and this characteristic, owing to a relatively greater breadth of this bone in the females, is common to all the other given groups, excepting the negro.

The infraspinous index is also high in the Munsee as compared with other Indians, the whites, and even the negroes. This is particularly the case in the males, in whom the infraspinous height is exceptionally low.

The female index again exceeds that of the males in the Munsee and in all other Indian groups, as well as in the whites, owing to the relatively greater breadth of the female scapula. The negroes show here once more an exception to the rule, and it would be interesting to trace how far this peculiarity may be prevalent in that race.

High indexes, such as those of the Indians, have been reported by Livon, Broca, Ranke, and others,¹ among some of the African negroes, the Melanesians, the Malays, the Guanches, and the Egyptians.

DESCRIPTIVE FEATURES

The principal points for visual observation to which attention has been given in this instance were (a) the shape of the scapula as a whole, with the development of the *teres major* region; (b) the form of the superior border of the bone; and (c) the development of the notch in the superior border.

Type of body.—The scapula as a whole may be more or less neatly triangular or wedge-shaped, which form will be designated as type 1. Again, it may be more acutely wedge-shaped, with both its axillary and vertebral border markedly concave, a type which the author classes as 3.² It may be quadrilateral, type 4, with the axillary border augmented by a shorter but well-marked inferior border, due to a development of a process or angle by the influence of the *teres major* muscle. It may be pentagonal, when the preceding type is augmented by a distinct angle in the axillary border at or above the spine, which divides it into two well-marked borders—type 5. Finally, we may have a shape resembling that in many lower mammals and characterized by marked convexity of the axillary border, which will be referred to as type 6.

Among the 19 Munsee scapulæ, a large majority show types 4 and 5, the few remaining specimens approaching type 1. There is no instance of the relatively rare type 3, nor of type 6, which is quite common in other Indians, particularly the males. The following table gives several series of records for comparison, including that of

¹ For literature, see R. Martin, *Lehrbuch der Anthropologie*, 1914; also A. C. Schüek, *Das Schulterblatt des Menschen und der Anthropoiden*, *Mittell. Anthr. Ges. Wien*, XL, 1910.

The few published reports on Indian scapulæ give scapular and infraspinous indexes as follows: Matiegka (Santa Rosa, Cal., Indians), 64.9; 90.8; Dorsey (Northwest Coast), 65.1; 83.2 (?); Martin (Fuegians), 65.4; 90.8; Martin (Peruvians), 66.6; 89; Matthews (Ancient Pueblos of Arizona), 71.1.

In the anthropoid apes the scapular index averages between 69 and 76 (Livon); but the infraspinous index is enormous, ranging from slightly over 100 in the orang to 156 in the chimpanzee.

² This form and various approaches to it have been referred to as "scaphoid" by Graves (*Jour. Amer. Med. Assoc.*, 1910, p. 12), and wrongly attributed to faulty development of the body.

United States whites. Analysis of the data shows some marked sexual as well as racial differences, the full value of which can not, however, be determined in the absence of more ample records. It is very plain, however, that type 1, or a close approach to it, and types 3 and 5 are, on the whole, more common in the females than in the males; while type 6 is decidedly more frequent in the males. Type 3 is relatively frequent in the whites, type 5 relatively scarce. In all probability the Indians differ considerably among themselves with respect to the shape of the scapulæ, as shown by the Munsee and Peruvian males, though the two series of specimens are very unequal in numbers. Minor differences in records of this nature can not be given any weight, for naturally the matter of classification of the different shapes is less perfect than that of accurate measurements.

LX. THE FORM OF THE SCAPULA: MUNSEE AND COMPARATIVE

MALES

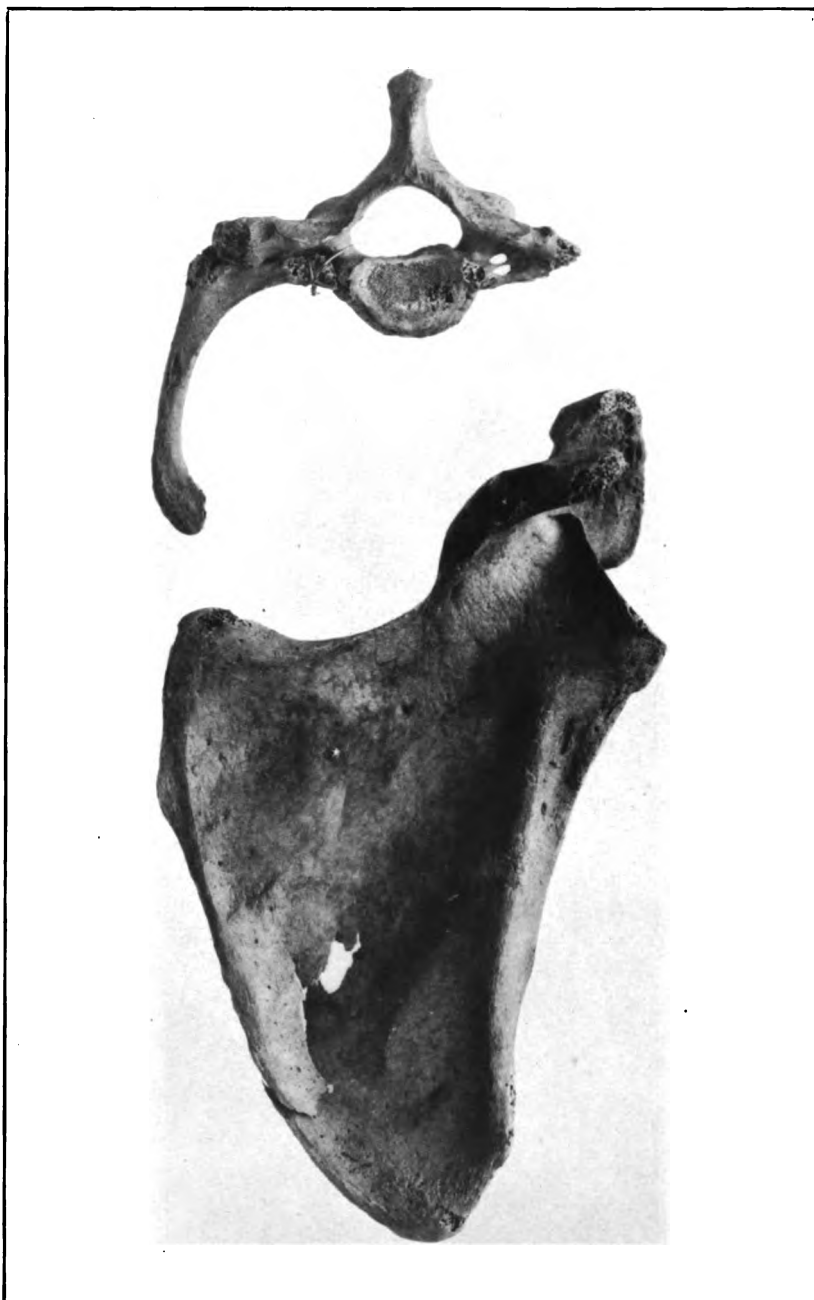
People	Specimens	Indefinite	Type 1 or near 1	Type 3	Type 4*	Type 5	near 5	Type 6	near 6
		Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Munsee.....	(8)	.....	12	.....	38	50	.....	.....	.....
Peruvian Indians.....	(57)	10.5	21	3.5	5	5	.....	37	17.5
United States whites (miscellaneous).....	(168)	4.8	28	9.5	9.5	17.9	7.7	14.3	8.3
United States negroes.....	(40)	.....	22.5	5	17.5	32	2.5	15	5

FEMALES

Munsee.....	(11)	.....	27	.....	27	27	18	.....	.....
Peruvian Indians.....	(38)	.....	29	5	5	39	11	8	3
United States whites (miscellaneous).....	(118)	1.7	32.2	13.6	15.2	16.1	8.5	8.5	4.2
United States negroes.....	(16)	.....	.....	25	19	37.5	6	.....	12.5

* The fourth, or *teres major*, border is present also, of course, in all instances of type 5, and in most specimens of type 4. It is particularly common in the Peruvian scapulæ.

Superior border.—The form of the superior border of the scapula can be divided for purposes of description into (1) horizontal or slightly rising and forming a right or nearly right angle with a vertical line passing upward from the base of the coracoid; (2) moderately rising or oblique and straight or but slightly curved, forming with the coracoid vertical an angle of between 85 and 55°; (3) markedly oblique, forming with the coracoid vertical an angle of less than 55°; (4) angular or deep saddle-shaped, which is of special importance anthropologically; and (5) markedly concave or semilunar (see pl. 25). In rare instances a form (6) occurs, in which the border is low and moderately convex, and another (7) in which it is markedly



a THE SEVENTH CERVICAL VERTEBRA OF FEMALE MUNSEE SKELETON NO. 285,311, U.S.N.M., WITH A CERVICAL RIB

b SCAPULA OF FEMALE MUNSEE SKELETON NO. 285,328, U.S.N.M., SHOWING SEMILUNAR SHAPE OF THE SUPERIOR BORDER

concavo-convex; and, finally, there occurs now and then an indeterminate form (I), which can not be classified.

LXI. FORM OF THE SUPERIOR BORDER OF THE SCAPULA IN THE MUNSEE AND IN OTHER RACIAL GROUPS

Group	Specimens	Types*						
		1	2	3	4 and near 4	5 and near 5	6	7
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
Munsee.....	(18)			31.2	25	43.8		
Northwest Coast Indians.....	(82)	6.7	27.5	35.4	25.6	4.9		
Southern Utah cliff-dwellers.....	(53)	16.9	54.7	20.7	7.6			
Mexican Indians.....	(41)	37.8	39.1	15.8	4.8	2.4		
Peruvian Indians.....	(95)		37.9	15.8	17.9	26.3		(†)
United States whites (miscellaneous).....	(1,032)	15	48.5	11	8.2	16.7	0.3	0.5

* Type 1—horizontal or but slightly inclined; 2—moderate to medium obliquity; 3—pronounced obliquity; 4—deep saddle-shaped; 5—semilunar; 6—convex; 7—markedly concavo-convex.

† In two specimens (2 per cent) the form of the border was unclassifiable.

The data obtained in this particular on the Munsee and other Indian groups, as well as on a large series of whites, are given in the next table. It is very evident that racial and tribal differences of some importance exist in the shape of the border. Among the whites its most common form is type 2, or moderate to medium oblique, pronounced obliquity being infrequent; types 4 and 5 occur but rarely. In the Munsee there is a curious but doubtless local prevalence of the semilunar type 5, the next most frequent form being that of pronounced obliquity; and one-fourth of the cases show the saddle form or an approach to it. Among other Indians the conditions differ. The cliff-dwellers of southern Utah come, on the whole, near to the whites; among the Mexican Indians low borders prevail, while among the Northwest Coast tribes we find the opposite condition—high borders, with a relative frequency of the angular or saddle-shaped type (4 or near 4). It is an interesting fact that the last named form (4) is frequent and often highly developed in the Eskimo.

The question occurs as to how the form of the superior border differs in the two sexes and on the two sides, and the next table throws some light on these problems. It will be observed that among the Indians the differences between the males and the females are not striking, though there is a tendency toward greater obliquity of the border in the males. Among the whites, types 1 and 4 are more common in the females than in the males; type 2 occurs about the same number of times in the two sexes, while types 3 and 5 are more frequent in the males.

LXII. FORM OF THE SUPERIOR BORDER IN MUNSEE AND OTHER INDIAN SCAPULÆ
ACCORDING TO SEX AND SIDE

Sex and side	Specimens	Types						
		1	2	3	4	2-4	3-4	5
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
Males (both sides).....	(84)	11.9	34.5	33.3	5.9	3.6	3.6	71
Females (both sides).....	(110)	20	35.5	21.8	5.5	4.5	7.3	5.5
Right (both sexes).....	(104)	18.3	33.6	22.1	8.7	5.8	6.7	4.8
Left (both sexes).....	(90)	14.4	37.8	31.1	2.2	2.2	4.5	7.8

As to the two sides, we find that a slightly lesser tendency to marked obliquity of the border exists in the left than in the right scapula; while the bone of the right side shows greater frequency of the angular or deep saddle-shaped (type 4 or near 4).

Scapular notch.—The notch in the scapular border, at the base of the coracoid, which, as is well known, transmits the suprascapular nerve, may be absent, shallow, medium deep, or converted into a complete foramen. Among the 21 scapulæ of the Munsee and 431 of whites, the conditions in this respect, with reference to sex and side, are as follows:

LXIII. SCAPULAR NOTCH IN THE MUNSEE AND IN WHITES

Sex	Specimens	Form 1 (absent)	Form 2 (shallow)	Form 3 (medium)	Form 4 (deep)	Form 5 (complete foramen)
Munsee:		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Male.....	(9)	.....	22	.....	67	11
Female.....	(12)	8	66	.....	16	.....
Peruvian Indians:						
Male.....	(57)	3.5	15.8	70.2	10.5	.....
Female.....	(37)	5.4	24.3	67.6	2.7	.....
Whites:						
Male.....	(267)	0.7	15.4	57.3	22.8	3.7
Female.....	(164)	3.7	15.2	64	16	1.2
Side						
Munsee:						
Right side.....	(11)	.....	40	.....	50	20
Left side.....	(10)	10	60	.....	30	.....
Peruvian Indians:						
Right side.....	(50)	4	22	68	6	.....
Left side.....	(44)	4.5	15.9	70.5	9.1	.....
Whites:						
Right side.....	(215)	2.3	14	62.3	18.6	2.8
Left side.....	(216)	1.4	17.6	56.5	21.8	2.8

It is plain that while among the whites the medium form of the notch very largely predominates, among the Munsee this form is absent, though this is doubtless accidental to some extent at least, owing to the relatively small number of specimens. The complete foramen is much more frequent in the Munsee than in the whites.

As to the sexes, in both the Munsee and the whites there is observable a predominance of the deeper forms and the complete foramen among the males, and of the shallower forms and the complete absence of the notch in the females.

As to sides, no characteristic differences in the notch appear.

RIBS

Owing to careful collection, a large majority of the ribs from the Munsee cemetery were preserved and are with their respective skeletons, thus facilitating their study. Furthermore, we possess nearly all the bones of the spines, which show the rib facets.

The ribs present are marked throughout by medium and normal development. Fractures are very rare, there being only two (in one subject) among the 166 ribs of the males, and but one in 196 ribs of the females.¹ This speaks well for the peaceful life of the community.

The number of ribs is normal (24) in every one of the adult males; among the females, however, there are two interesting anomalies—namely: In female no. 285,311 there are 25 ribs, the additional one being well developed, 6.5 cm. long, right cervical; this rib approaches in form the ordinary first rib, while both the latter are unusually long, being about one-third longer than any of the other female first ribs in the series. The spinal formula in this case, curiously enough, is only 7-12-4, the fifth lumbar being attached to the sacrum. The second anomaly is present in female skeleton no. 285,321, with the spinal formula of 7-11-5, and consists of the absence of the last pair of ribs. The congenitally absent dorsal vertebra is the twelfth.

The first rib generally repays special examination, particularly as to its shape. This shows three main types—(1) the curved; (2) the mono-angular or pistol-shaped, with a nearly straight neck and straight body; and (3) the biangular, in which, besides the angle between the neck and the body, there is another distinct angle in the body itself, so that the rib appears as if it consisted of three segments. The relative frequency of these forms the author has reason to believe will be found to differ in the race and sex, but as a rule it is the same on both sides. In the Munsee the shapes found were as follows:

LXIV. MUNSEE: SHAPE OF RIBS

	Subjects	Type 1 or near 1	Type 2 or near 2	Type 3 or near 3
Males.....	(10)	<i>Per cent</i> 70	<i>Per cent</i> 20	<i>Per cent</i> 10
Females.....	(12)	75	25	.....

¹ Or 8 in 1,000. Among the whites, dissecting-room material, in a total of 16,300 ribs examined, the author found fractures in the first rib in the proportion of 4 in 1,000; in the second rib, 20 in 1,000; and in the ribs below the second, 49.3 in 1,000.

The biangular form, which is fairly frequent in whites, is nearly absent in the Munsee, the one pair in the males presenting merely an approach to the form.

SPINE

The entire number of vertebræ of 21 skeletons has been preserved, thus affording an excellent opportunity for studying the numerical relations of the bones, as well as other particulars.

The bones are entirely normal, with the exception of the frequent slightly to moderately developed marginal exostoses (which, unless premature or excessive, the author regards more and more as the usual manifestations of age rather than of disease), and one case of advanced spondylitis deformans, resulting in fusion of the lower half of the spine and the sacrum. The bones show moderate to medium development and are free from gross anomalies.

As to numbers, the cervical vertebræ show but one exception to the normal—namely, in male skeleton no. 285,326, in which only six vertebræ are present in this region. The locus of the (congenitally) missing one is between the third and the sixth, its exact identity being difficult to determine. In one of the females (no. 285,311) the seventh cervical, as already mentioned, gives attachment on the right to a well developed cervical rib (pl. 25, *a*).

The vertebræ of the dorsal region are also normal in number in all cases but one, which has been mentioned in connection with the ribs; it is no. 285,321, female, and presents a congenital absence of the twelfth vertebra.

The numbers of the lumbar vertebræ show frequent variation. In two of the ten males and two of the eleven females there are but four lumbar, while in one female there are six. In detail we find the following abnormalities:

In male skeleton no. 285,316, the fifth lumbar shows a transitional, sacral form, though not attached to the sacrum, and it also presents a detachment of the posterior part of its neural arch.

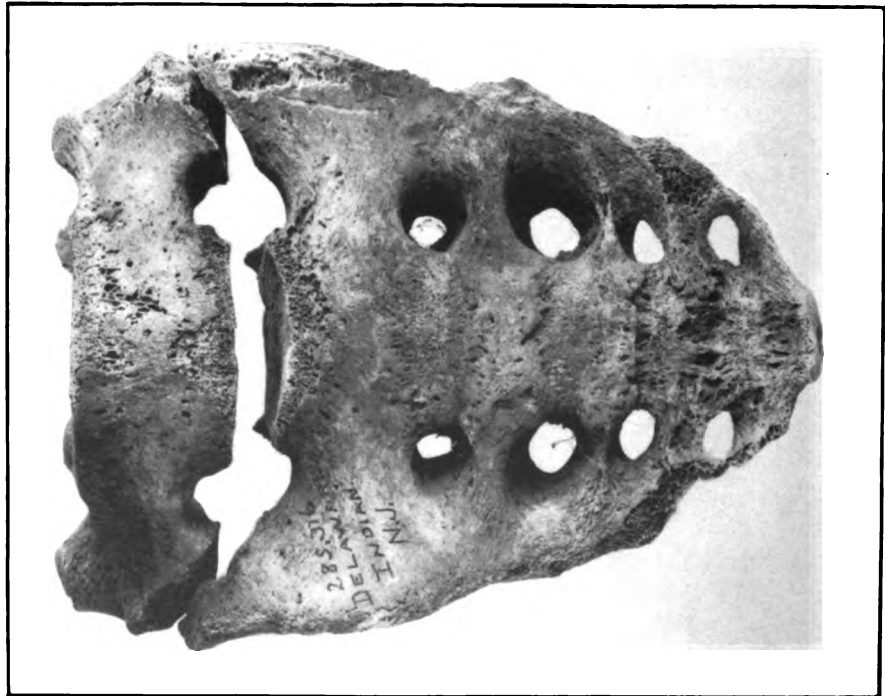
In male no. 285,326, one of the lumbar vertebræ between the second and fifth is absent congenitally.

In female no. 285,310, one of the lumbar vertebræ is missing congenitally; the last lumbar in this case is in form like the fifth; the upper segment of the sacrum is somewhat lumbar-like, but the bone possesses only five segments and a normal curvature:

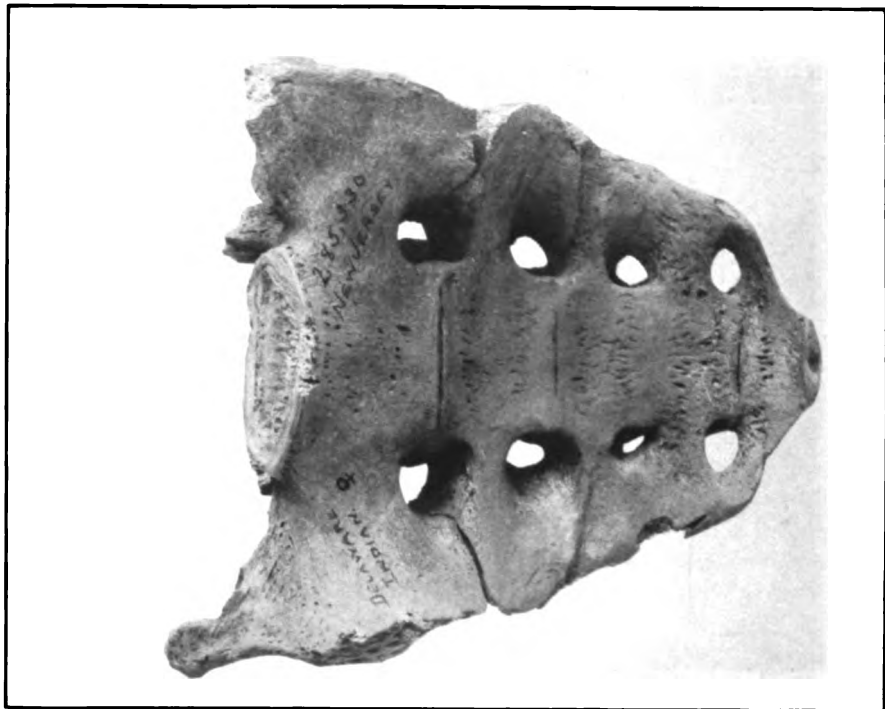
In female no. 285,311, with four lumbar vertebræ, the fifth, somewhat modified, is attached to the sacrum (pl. 27).

In female no. 285,326, where we have six lumbar vertebræ, the last, like the lowest lumbar in male no. 285,316, shows a separation of the posterior portion of the neural arch.

In male no. 285,308, the twelfth dorsal and the first lumbar show complete and evidently early non-pathological fusion.



a MALE MUNSEE SACRUM SHOWING BILATERAL ARTICULATION WITH AN EXTRA SEGMENT INTRODUCED BETWEEN THE LAST LUMBAR AND THE SACRUM



b FEMALE MUNSEE SACRUM SHOWING BILATERAL ARTICULATION WITH EXTRA SEGMENT

SACRUM

GENERAL OBSERVATIONS AND MEASUREMENTS

The total number of serviceable specimens of sacra is 17, only 13 of which, however (six males and seven females), are five-segment bones and sufficiently well preserved to afford the necessary measurements. The results show that, as usual, the male sacrum, while in breadth nearly equal to that of the female, is perceptibly higher, in consequence of which the sacral index, or percental relation of breadth to height, is lower in the males.

A comparison of the Munsee sacra with those of other Indians and United States whites shows marked agreement both in size and in the relative proportions of the bone in the males, but less in the females. As will be seen by the next table, the Munsee female sacrum is somewhat lower than that of any of the other series.¹

LXV. MUNSEE SACRUM: DIMENSIONS

	Males				Females			
	Number of specimens	Height*	Breadth, maximum	Index $B \times 100 / H$	Number of specimens	Height	Breadth, maximum	Index $B \times 100 / H$
Average.....	(6)	cm. 10.7	cm. 11.6	108.2	(7)	cm. 9.9	cm. 11.7	118.5
Average (including damaged specimens).....	All	-----	-----	-----	(11)	-----	11.5	-----
Minimum (including damaged specimens).....	All	9.9	11.3	102.6	(11)	8.9	11	104.7
Maximum (including damaged specimens).....	All	11.5	12.0	114.1	(11)	10.7	12.8	126.0

* Sacra of five segments only included; height measured with sliding compass, points of instrument applied to middle of promontory and to middle of anterior inferior border of V sacral vertebra.

Emmons, who a few years ago, with the writer's assistance, conducted an examination of 217 Indian female pelvises,² obtained as a total average of his specimens (which however include also sacra of more than five segments), for the height 10 cm., breadth 11.5 cm., and index 115.8—figures which stand in close accord with the above. In the Negro race and in the Australians the sacrum, as is well known, is relatively narrower; and in much larger degree this is also the case in the anthropoid apes. The relatively broad and short sacrum of the whites and the Indians may therefore be regarded as a feature of an advanced evolutionary character.

¹ The sacra from the Arkansas and Louisiana mounds, of which a small series was reported previously by the writer (*Remains from Arkansas and Louisiana*, op. cit.), appeared unusually high; in the much larger series here presented, however, they are seen to form no exception in this respect to those of other Indians.

² A. B. Emmons, *A Study of the Variations in the Female Pelvis, Based on Observations made on 271 Specimens of the American Indian Squaw*, *Biometrika*, ix, 1913, pp. 24-57.

LXVI. SACRUM: COMPARATIVE DATA

People	Males				Females			
	Number of specimens*	Height	Breadth	Index	Number of specimens	Height	Breadth	Index
Munsee.....	(6)	cm. 10.7	cm. 11.6	108.2	(7)	cm. 9.9	cm. 11.7	118.5
Arkansas and Louisiana mounds.....	(18)	10.95	12.2	111.6	(22)	10.2	11.96	117.2
Southern Utah cliff-dwellers.....	(22)	10.8	11.55	106.9	(10)	10.1	11.33	112.2
Southwest and Mexico...	(15)	10.7	11.36	106.2	(18)	10.4	11.5	110.6
United States whites (various nationalities)†.	‡ (56)	10.62	11.67	109.9	(25)	10.18	11.75	115.4

* Five-segment sacra only.

† There were two separate series which gave remarkably similar results:

(a) Males: (26) H. 10.6, B. 11.7, Ind. 115; females: (12) H. 10.2, B. 11.73, Ind. 115.

(b) Males: (30) H. 10.63, B. 11.64, Ind. 115.8; females: (13) H. 10.16, B. 11.77, Ind. 115.8.

‡ Forty-six additional five-segment adult sacra, both sexes together, gave the writer—height 10.4, breadth 11.76, index 113.

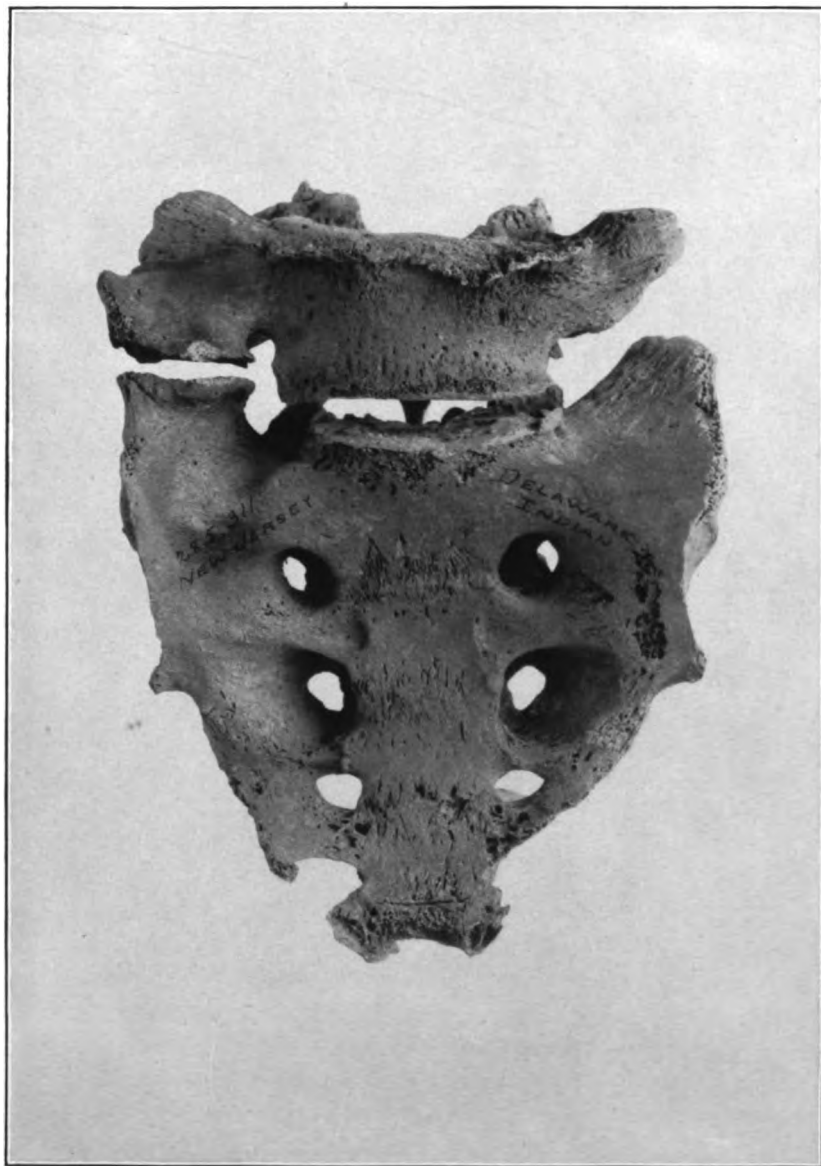
SEGMENTS

Among the eight male Munsee sacra in which determination of the number of segments is feasible, six show five and two show six vertebræ, while among the 12 female bones there are 10 with five and two with six segments. We have thus four six-segmented sacra in 20, or 20 per cent. Emmons, in 217 female Indian pelvises, found six segments in 19.8 per cent of the cases.

Among additional specimens examined by the writer, in 53 sacra of the southern Utah cliff-dwellers, five vertebræ were present in 37, or 70 per cent; six in 15, or 28 per cent; and seven in one, or 2 per cent. Of 42 sacra of Southwestern and Mexican Indians, 31, or 74 per cent, showed five; 10, or 24 per cent, six; and one, or 2 per cent, seven segments. As to whites, among 503 sacra of miscellaneous Americans of both sexes, five segments were present in only 66.4 per cent of the bones; six segments in 31 per cent; seven segments in 2 per cent, and eight in 0.4 per cent, while the whole coccyx was attached, non-pathologically, in one instance. The frequency of more than five vertebræ in the sacrum is therefore slightly to decidedly less in probably all the tribes of Indians than in the United States whites.

CURVATURE

The curvature of the sacrum in the Munsee can be described in 18 of the 20 specimens as medium, while in two (one male and one female) it is submedium. This agrees closely with the author's observations on this feature in other Indians. In the United States whites the proportion of regular and medium forms is smaller, while not infrequently there exists in the sacrum of whites a pronounced



FEMALE MUNSEE SACRUM SHOWING UNILATERAL ARTICULATION
WITH THE LAST FIFTH LUMBAR

curvature, which is very rare in the Indian. Among 115 Indian sacra from Arkansas, Louisiana, the Southwest, and Mexico, the writer found moderate or medium curvature in 75, or 65 per cent; submedium to slight in 24, or 21 per cent; and pronounced (though never excessively) in 16, or 14 per cent. Among the 217 specimens examined by Emmons, moderate or medium curvature was present in 148, or a little more than 67 per cent; submedium in 52, or 24 per cent; and pronounced in 18, or 8 per cent.

The curve of the sacrum begins in the Munsee (and the same is true of other Indians) in a majority of cases with the first or uppermost segment, but in numerous instances with the second vertebra. More in detail, among the 20 Munsee sacra, in 13, or 65 per cent, the curve began with the first; in six, or 30 per cent, with the second; and in one, or 5 per cent of the cases, with the third vertebra. Among 113 sacra of both sexes from Arkansas, Louisiana, the Southwest, and Mexico, examined by the writer, the curve began in 52, or 46 per cent of the cases, with the first; in 42, or 37 per cent, with the second; in 14, or 12 per cent, with the third; and in five, or 4 per cent, with the fourth vertebra. In the female series studied by Emmons, the curve began in 41.5 per cent of the cases with the first; in 27 per cent with the second; in 22.5 per cent with the third; in 7.4 per cent with the fourth; and in 1.8 per cent with the fifth segment. Among whites, in 224 sacra of five segments examined by the writer, the curve began with the first vertebra in 87 per cent; with the second in 5.4 per cent; and with the third in 7.6 per cent of the cases. It is therefore evident that the anterior curve of the sacrum begins more frequently higher up in the whites than in the Indians. This peculiarity is probably connected with a somewhat greater curvature, even on the average, in the sacrum of whites.

OSSA INNOMINATA AND PELVIS

THE OSSA INNOMINATA

The total number of adult innominate bones of the Munsee, available for examination and measurement, is 37, and in general the bones are remarkable for their regular development, with complete freedom from pathological conditions and from the more important anomalies. They are also of medium dimensions and weight throughout.

The measurements of the bones show that in the paired specimens, in both sexes, they are of nearly the same dimensions on the two sides. The male bones exceed those of the female in both height and breadth, and especially in the former, but relatively to its height the female innominate is broader than that of the male, as a result of which the innominate height-breadth index is higher in the females.

LXVII. MUNSEE: INNOMINATE BONES

MALES											
	Right					Left					
	Number of bones	Height maximum (ischio-iliac) (a)	Number of bones	Breadth maximum (of ilium) (b)	Number of cases	Innominate index $\frac{(b \times 100)}{a}$	Number of bones	Height maximum (a)	Number of bones	Breadth maximum (of ilium) (b)	Number of cases
Average:		cm.		cm.				cm.		cm.	
Pairs...	(5)	21.2	(5)	15.6	(5)	73	(5)	21.2	(5)	15.6	(5)
All.....	(7)	21.2	(6)	15.6	(6)	73.8	(6)	21.3	(5)	15.6	.....
Minimum..	(7)	20.8	(6)	15.1	(6)	70.7	(6)	20.8	(5)	15.2	.....
Maximum..	(7)	22.2	(6)	16.2	(6)	75.1	(6)	21.8	(5)	16	.....
FEMALES											
Average:											
Pairs...	(11)	20.1	(5)	14.95	(5)	75.6	(11)	20.1	(5)	14.9	(5)
All.....	(11)	20.1	(8)	15.2	(8)	75.9	(13)	20	(10)	14.75	(10)
Minimum											
(all).....	(11)	18.5	(8)	13.6	(8)	72	(13)	18.5	(10)	13.5	(10)
Maximum											
(all).....	(11)	20.7	(8)	16	(8)	78.9	(13)	20.8	(10)	15.8	(10)

Comparative data on the innominate bones are given in the next table. The Arkansas and Louisiana specimens, as well as those of other Indians, agree closely with those of the Munsee. The innominate of the whites, on the other hand, is both higher and especially broader, hence it shows a higher index in both sexes. Emmons, from his 217 Indian female pelvises, obtained as an average height of the innominate 19.3 cm., and as the breadth 14.5 cm., with a mean index of 74.8. These results agree closely with those of the writer and strengthen the evidence that the innominate bones in the Indians average somewhat smaller in both dimensions, and are also somewhat narrower relatively than those in the whites.

LXVIII. COMPARISON OF THE MUNSEE OSSA INNOMINATA WITH THOSE OF OTHER INDIANS AND OF WHITES

MALES							
Group	Right				Left		
	Specimens (pairs)	Height maximum (ischio-iliac)	Breadth maximum	Innominate index	Height maximum (ischio-iliac)	Breadth maximum	Innominate index
		cm.	cm.		cm.	cm.	
Munsee.....	(16)	21.3	15.6	73.4	21.2	15.6	73.2
Arkansas and Louisiana.....	(13)	21.2	15.4	72.7	21.3	15.35	72.1
Southern Utah cliff-dwellers....	(20)	20.5	15.0	73.2	20.5	15	73.3
Southwest and Mexico.....	(12)	20.7	15.2	73.7	20.7	15.2	73.5
United States whites.....	(32)	22.03	16.43	74.6	22.1	16.47	74.45

LXVIII. COMPARISON OF THE MUNSEE OSSA INNOMINATA WITH THOSE OF OTHER INDIANS AND OF OTHER WHITES—Continued

FEMALES

Group	Right				Left		
	Specimens (pairs)	Height maximum (ischio-iliac)	Breadth maximum	Innominate index	Height maximum (ischio-iliac)	Breadth maximum	Innominate index
Munsee.....	(11)	cm. 20.1	cm. 14.95	75.6	cm. 20.1	cm. 14.9	75.1
Arkansas and Louisiana.....	(8)	19.8	15	75.7	19.95	15.1	76.1
Southern Utah cliff-dwellers.....	(7)	19	14.3	75.4	19.1	14.2	74.6
Southwest and Mexico.....	(12)	19.1	14.6	76.6	19.2	14.75	76.8
United States whites.....	(20)	20.2	15.73	77.9	20.1	15.7	78.1

THE PELVIS AS A WHOLE

The Munsee pelves available for measurement comprise those of six males and ten females. They are free from all deformation, and present the usual sexual characteristics with regard to massiveness, the flare of the ilia, the subpubic angle, and the width of the great sciatic notch.

The articulated pelves, with a slight space left for the pubic cartilage, gave measurements shown in the table below. The male pelvis, it is seen, is somewhat larger than the female in both of its mean external dimensions, and is also somewhat higher relatively, as a result of which it shows a higher height-breadth index.

LXIX. MUNSEE: PELVIS AS A WHOLE

MALE

	Number	Mean height of ossa innominata	Breadth maximum of pelvis	Pelvic index*	Superior Strait		
					Breadth maximum (a)	Diameter† antero-posterior (b)	Brim index $\frac{b \times 100}{a}$
Average.....	(6)	cm. 21.2	cm. 26.7	78.9	cm. 12.1	cm. 10.6	87.8
Minimum.....	(6)	20.8	24.4	76.6	11.6	9.6	78.7
Maximum.....	(6)	21.5	28.2	85.9	12.8	11.2	98.3

FEMALE

Average.....	(10)	19.95	25.9	77.0	13.0	11.0	84.5
Minimum.....	(10)	18.5	24.1	73.3	12.3	9.4	70.7
Maximum.....	(10)	20.7	27.8	80.4	13.8	12.5	94.4

* $\frac{\text{Mean height of innominate bones} \times 100}{\text{maximum breadth of pelvis}}$

† Promontory of sacrum to nearest point on the inner lip of pubic bones.

The pelvic cavity at the superior strait or brim is more spacious, both antero-posteriorly and laterally, in the Munsee female than in the male, and it is also somewhat broader relatively to its depth, as a result of which it gives a somewhat lower depth-breadth index.

On comparison with the pelves of the mound-building Indians of the Arkansas and Louisiana mounds, those of the Southwest and Mexico, and those of United States whites, it is seen that the Munsee pelvis, as a whole, is of moderate dimensions, especially in its breadth, which is slightly smaller than that in any of the other groups in the males and in most of the females. Because of this fact, the height-breadth index of the pelvis in the Munsee is relatively high—higher than that of any of the other Indians. It is exceeded in this respect only by the pelvis of the white males.

An even more marked peculiarity of the Munsee pelvis applies to its inlet or brim. As will be seen by a glance at the figures, this is relatively narrow and deep in both sexes; the lateral diameter, with a single minor exception, is the lowest, and the diameter antero-posterior the highest of all the groups. As a result of this condition, the brim index of the Munsee in both males and females is exceptionally high.

LXX. COMPARISON OF THE MUNSEE PELVIS WITH THAT OF OTHER INDIANS AND OF WHITES

MALES

Group	Specimens (pairs)	Mean height of ossa innominata	Greatest breadth of pelvis (between outer lips of crests)*	Pelvic index	Diameter lateral maximum of brim	Diameter antero-posterior maximum of brim	Brim index
		cm.	cm.		cm.	cm.	
Munsee.....	(6)	21.2	26.7	78.9	12.1	10.6	87.8
Arkansas and Louisiana	(23)	21.55	28.1	76.7	13	10.4	79.8
Southern Utah cliff-dwellers.....	(23)	20.6	26.85	76.7	12.4	10	80.6
Southwest and Mexico..	(15)	20.6	27	76.2	12.3	9.7	78.7
United States whites...	(32)	22.06	27.1	81.4	12.7	9.64	75.9

FEMALES

Munsee.....	(10)	19.95	25.9	77.0	13	11	84.5
Arkansas and Louisiana	(12)	19.7	26.8	73.5	13.33	10.74	81.4
Southern Utah cliff-dwellers.....	(7)	19.05	25.4	74.5	13.1	10.1	77.4
Southwest and Mexico..	(12)	19.15	25.7	74.4	12.9	10.75	83.1
United States whites...	(20)	20.16	27.05	74.5	13.35	10.73	80.4

*The pelvis being held in articulation.

The brim index in general shows unexpected irregularity from group to group and between the two sexes. In the Munsee and the

southern Utah cliff-dwellers it is higher in the males; in the other Indians and in the whites it is higher in the females; and the range of its groupal as well as individual variation is considerable. As all the specimens were measured by the author with the same instruments, by the same method, and with equal care, the differences can not be attributed to error, hence the only reasonable conclusion is that even under normal conditions (for these series contain no deformed or pathological pelves) the absolute as well as the relative dimensions of the superior strait are capable of not a little fluctuation, attributable, it seems, in some measure at least, to an early unequal development of the soft parts both within and without the pelvic cavity.

In order to satisfy himself further on this point, the writer extracted a number of the larger series of pelvic measurements from Emmons's data, and from the next table it will be seen that, although they relate to females only, the groupal variation is also marked. Yet these differences among the Indians rarely if ever fall below what may be considered normal limits, or such a limit as would in the female still permit of safe childbirth under other normal conditions. They are therefore what may be called *infunktional* or *transfunktional* fluctuations.

LXXI. FEMALE INDIAN PELVIS: SUPERIOR STRAIT*

Group	Specimens	Diameter antero- posterior	Diameter lateral	Index
		cm.	cm.	
Northwest coast.....	(31)	12.99	10.7	82.39
California.....	(16)	13.2	10.56	80
Sioux.....	(12)	13.03	10.98	84.26
Tennessee.....	(6)	13.32	10.93	82.01
Kentucky.....	(8)	13.09	10.66	81.42
New Mexico.....	(10)	13.26	10.43	78.65
Arizona.....	(57)	12.87	9.52	74.01
Mexico.....	(15)	12.71	10.93	85.55
Peru.....	(13)	12.71	10.12	79.58

* Emmons's series.

SHORT AND OTHER BONES

PATELLA

The patella, the largest of the sesamoid bones, offers three dimensions for measurements, namely, the maximum height, the maximum breadth, and the maximum thickness; and the mean of these diameters, the *patellar module*, is a convenient unit for comparing the size of the bone.

The 30 patellæ present in the Munsee collection give proportions which are tabulated below. The male bone is perceptibly larger in all dimensions than the female. There are but small differences as

to side, and they are probably due in a measure, if not entirely, to the small number of specimens. The mean diameter or module is practically the same on both sides in both the male and the female. The breadth-height index averages slightly over 100 and offers nothing definitely distinctive either as to sex or to side. It varies in males from 91.7 to 107.4, in the females from 93.8 to 107.9.

LXXII. MUNSEE: PATELLÆ

MALES

	Right							
	Num- ber	Height, maxi- mum	Num- ber	Breadth, maxi- mum	Num- ber	Thick- ness, maxi- mum	Num- ber	Breadth- height index
Average:		cm.		cm.		cm.		
Pair	(4)	4.5	(4)	4.6	(4)	2.11	(4)	102.3
All	(6)	4.41	(6)	4.57	(6)	2.06	(6)	103.6
Minimum (all)	(6)	4.2	(6)	4.4	(6)	1.95	(6)	97.8
Maximum (all)	(6)	4.6	(6)	4.8	(6)	2.3	(6)	105.9
	Left							
	Num- ber	Height, maxi- mum	Num- ber	Breadth, maxi- mum	Num- ber	Thick- ness, maxi- mum	Num- ber	Breadth- height index
Average:		cm.		cm.		cm.		
Pairs	(4)	4.6	(4)	4.55	(4)	2.1	(4)	98.9
All	(10)	4.36	(11)	4.38	(12)	2.04	(10)	100.5
Minimum (all)	(10)	4	(11)	3.9	(12)	1.85	(10)	91.7
Maximum (all)	(10)	4.8	(11)	4.7	(12)	2.25	(10)	107.4

FEMALES

	Right							
	Num- ber	Height, maxi- mum	Num- ber	Breadth, maxi- mum	Num- ber	Thick- ness, maxi- mum	Num- ber	Breadth- height index
Average:		cm.		cm.		cm.		
Pairs	(5)	3.93	(5)	4.02	(8)	1.73	(5)	102.3
All	(9)	3.93	(9)	3.97	(11)	1.75	(9)	100.4
Minimum (all)	(9)	3.7	(9)	3.7	(11)	1.5	(9)	93.8
Maximum (all)	(9)	4.1	(9)	4.3	(11)	1.9	(9)	107.9
	Left							
	Num- ber	Height, maxi- mum	Num- ber	Breadth, maxi- mum	Num- ber	Thick- ness, maxi- mum	Num- ber	Breadth- height index
Average:		cm.		cm.		cm.		
Pairs	(5)	3.93	(5)	4.05	(8)	1.76	(5)	103.1
All	(5)	3.95	(5)	4.05	(8)	1.76	(5)	103.1
Minimum (all)	(5)	3.8	(5)	3.85	(8)	1.5	(5)	96.2
Maximum (all)	(5)	4.05	(5)	4.1	(8)	1.95	(5)	107.9

Module (mean diameter)—Males: right, 3.74; left, 3.75; females: right, 3.23; left, 3.25.

A comparison of the Munsee patella with that of whites shows that the latter is slightly larger in both sexes and on both sides; its relative proportions, however, are very much the same, except that the bone in white males on both sides appears to be relatively

slightly higher than in the females, which, while also true of the Munsee on the right side, does not hold true for the left.

LXXIII. PATELLÆ: MUNSEE AND WHITES

MALES

Group	Specimens (pairs)	Right				Left			
		Height	Breadth	Thickness	Breadth-height index	Height	Breadth	Thickness	Breadth-height index
		cm.	cm.	cm.		cm.	cm.	cm.	
Munsee.....	(8)	4.5	4.6	2.11	102.8	4.6	4.55	2.1	98.9
United States whites.	*(200)	4.56	4.64	2.15	101.7	4.52	4.66	2.17	103.2

Module (mean diameter)—Males: Munsee, right, 3.74; left, 3.75; whites, right, 3.78; left, 3.78.

FEMALES

Munsee.....	(10)	3.93	4.02	1.73	102.3	3.93	4.05	1.76	103.1
United States whites.	*(100)	4.02	4.03	1.9	100.2	3.97	4.08	1.9	102.7

Module—Females: Munsee, right, 3.23; left, 3.25; whites, right, 3.32; left, 3.32.

* Males: 100 right, 100 left; females: 50 right, 50 left patellæ.

The Munsee patella, while in general slightly smaller than that of the whites, will be seen from the comparative data in the accompanying table to average somewhat larger than that of other Indians available for comparison. The larger size in all dimensions of the white man's patella than that of the Indian is doubtless due to the greater muscularity of the white subjects from which the bones were derived and who belonged almost exclusively to the laboring classes.

Of the 30 Munsee patellæ, 15 show a moderate to well developed semilunar notch in the lateral border of the bone, for the *vastus lateralis* (pl. 28, b). The patellæ of female skeleton no. 285,311 are decidedly oblique, especially that on the left side; and the patellæ of female no. 285321 show each an exceptionally long apex.

LXXIV. THE MODULE OR MEAN DIAMETER OF THE PATELLA IN THE MUNSEE AND OTHER GROUPS

Group	Male		Female	
	Right	Left	Right	Left
	cm.	cm.	cm.	cm.
Munsee.....	3.74	3.75	3.23	3.25
Arkansas and Louisiana.....	3.54	3.50	3.17	3.17
Southern Utah cliff-dwellers.....	3.61	3.58	3	3
Southwest and Mexico.....	3.49	3.49		
United States whites.....	3.78	3.78	3.32	3.32

BONES OF THE HAND

While the total number of bones of the hands in the Munsee material aggregate nearly 700, there are very few complete sets. It is nevertheless possible to ascertain that in general the hand of the Munsee was of moderate to medium development, and remarkably normal in conformation. Among the females, some of the bones are quite small. The only anomaly worthy of mention is the presence of rudimentary hamuli on both unciforms in one of the male subjects (no. 285,308).

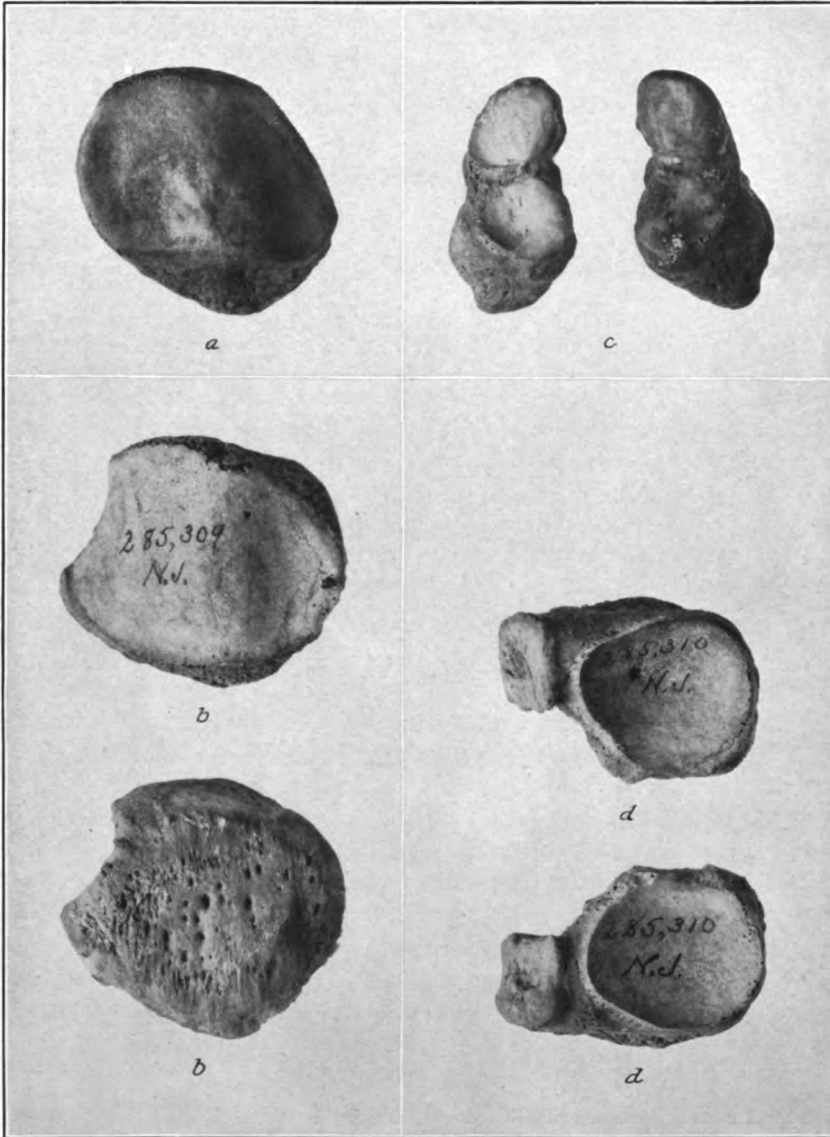
The proportional length of the hand can be judged from the measurements of the first metacarpal, and from the relation of this length to that of the humerus on the same side. The following table gives these dimensions. It is seen that the length of the first metacarpal in the male exceeds somewhat that of the female, and also that the length of the right bone exceeds slightly that of the left. The metacarpo-humeral index is somewhat higher on the right in the males, indicating a somewhat greater length of the hand on the right side in that sex. In the females the small number of specimens makes the result in this respect uncertain.

LXXV. MUNSEE: FIRST METACARPAL

MALES						
Right				Left		
	Number of specimens	Length, maximum	*Metacarpo-humeral index $\frac{mc \times 100}{H}$	Number of specimens	Length, maximum	Metacarpo-humeral index
Average:		cm.			cm.	
Pairs.....	(5)	4.6	14.5	(5)	4.5	14.1
Total present.....	(8)	4.7	14.5	(5)	4.5	14.1
Minimum (total present).....	(8)	4.2	12.9	(5)	4.25	12.9
Maximum (total present).....	(8)	5.1	16.2	(5)	4.8	15
FEMALES						
Average:						
Pairs.....	(5)	4.3	14	(5)	4.3	14.3
Total present.....	(8)	4.4	14.3	(7)	4.2	12.9
Minimum (total present).....	(8)	3.9	13.2	(7)	3.75	12.8
Maximum (total present).....	(8)	4.8	15.3	(7)	4.8	15.8

* $\frac{\text{Maximum length of first metacarpal} \times 100}{\text{Maximum length of humerus.}}$

A comparison of the first metacarpal in the Munsee and in the United States whites shows that this bone in the Munsee on both sides (and in both sexes) is somewhat shorter, indicating a smaller



- a* PATELLA OF FEMALE MUNSEE SKELETON NO. 285,311, U.S.N.M.,
SHOWING MARKED OBLIQUITY
- b* PATELLÆ OF FEMALE MUNSEE SKELETON NO. 285,309, U.S.N.M.,
SHOWING PRONOUNCED VASTUS NOTCH
- c* INTERNAL CUNEIFORM OF MALE MUNSEE SKELETON NO. 285,301,
U.S.N.M., SHOWING EACH A DOUBLE METATARSAL FACET
- d* PAIR OF FEMALE MUNSEE SCAPHOIDS SHOWING UNUSUAL BROAD
TALUS FACET AND PECULIAR TUBEROSITY

hand. This is also apparent in the metacarpo-humeral index, which on both sides in the whites is higher than in the Munsee. The absolute and relative smallness of the Indian hand, particularly in the males and on the right side, is doubtless due to its lesser use.

LXXVI. FIRST METACARPAL IN MUNSEE AND IN WHITES

Both sexes	Specimens	Length, maximum	Metacarpo- humeral index	Specimens	Length, maximum	Metacarpo- humeral index
		cm.			cm.	
Munsee.....	(16)	4.55	14.4	(12)	4.35	14.0
United States whites.....	(94)	4.69	14.9	(65)	4.43	14.3

BONES OF THE FEET

Owing to their larger size and greater differentiation, a number of the bones of the feet, particularly of the tarsus, yield material for measurement and special observation, and have received rather extended attention by anatomists and anthropologists,¹ but as yet there is no perfect uniformity in the methods of measurement or of description. The writer's object in selecting his measurements and points for description was to employ only those that appear to be the most sensible and significant, the most readily standardized, and involving no details, save in cases that may be of special importance.

First Metatarsal

As the first metacarpal serves in a measure as an index of the size of the hand, so the first metatarsal gives an indication of that of the foot. The proportional length of the foot can further be judged from the percental relation of the first metatarsal to the femur. The relation between the size of the feet and that of the hands is expressed by the pollex-hallux index, or percental relation between the first metacarpal and the first metatarsal.

There are in all 36 first metatarsals among the Munsee bones, the measurements and relations of which are given in the above table. It will be seen that the length of the bone is, on the average, greater in the males than in the females, but it does not differ perceptibly on the two sides of the body in either sex.

The hallux-femur index is practically equal on the two sides (differing only in centesimals), and is larger in the males than in the females, showing that the foot of the Munsee male was not only somewhat larger than that of the female, but was also larger

¹ S. P. Lazarus, Zur Morphologie des Fußskelettes, *Morphol. Jahrb.*, xxiv, H. 1, repr., 8°, Leipzig, 1896; W. Pfltzner, Beiträge zur Kenntniss des menschlichen Extremitätenskelets, *Morphol. Arbeiten*, 1, H. 1, Jena, 1891; Th. Volkov, *Variations squelettiques du pied chez les primates et dans les races humaines*; Thèse doctorale de la Faculté des Sciences, Paris, 1905; Chas. Fraipont, *L'Astragale de l'homme Moustérien*, etc., 8°, Bruxelles, 1912; M. Reicher, Beitrag zur Anthropologie des Calcaneus, *Archiv für Anthropologie*, N. F., xii, H. 2, 1913; S. Poniatowski, Badania Antropologiczne nad Kóścią Skokowa (Anthropological Studies of the Talus), *Prace Towarzystwa Naukowego Warszawskiego*, 1913.

in that sex in relation to the length of the femur and the stature. This relative excess of the foot is more marked than was that of the hand, and in all probability is a result of greater functional activity, the male Indians being excessive walkers and runners.

A comparison of the first metatarsal in the Munsee and in the United States whites shows that in the latter, in both sexes, the bone is longer, indicating, on the average, a longer foot. The difference is especially marked on the left side and is probably both racial and functional.

As a result of the greater length of the bone in the United States whites, whose average stature is very nearly that of the Munsee, we find that their hallux-femur index is decidedly higher than that of the Munsee, especially on the left side. The white man's foot is therefore not only longer absolutely, but also relatively as compared with the femur and, indirectly, the stature.

The foot of the whites is also somewhat longer relatively to the hand, than that of the Munsee, and especially on the left side, which gives us a lower pollex-hallux index for the whites.

LXXVII. MUNSEE: FIRST METATARSAL

MALES

	Right						Left					
	Number of specimens	Length, maximum	Number of cases	Pollex-hallux Index *	Number of cases	Metatarso-femoral index †	Number of specimens	Length, maximum	Number of cases	Pollex-hallux Index	Number of cases	Metatarso-femoral index
Average:		cm.						cm.				
Pairs.....	(6)	6.5	(4)	70.4	(5)	14.7	(6)	6.5	(4)	69.2	(5)	14.7
Total present.	(11)	6.5	(8)	72.4	(9)	14.5	(8)	6.48	(4)	69.2	(7)	14.2
Minimum (total present).....	(11)	6.1	(8)	65.1	(9)	13.8	(8)	6.3	(4)	65.4	(7)	12.9
Maximum (total present).....	(11)	6.8	(8)	76.6	(9)	15.1	(8)	6.8	(4)	71.1	(7)	15.2

FEMALES

Average:												
Pairs.....	(7)	6.0	(4)	73.2	(6)	14.2	(7)	6.0	(4)	73.9	(6)	14.2
Total present.	(8)	5.97	(7)	72.2	(7)	14.1	(9)	5.91	(6)	72.4	(7)	14.1
Minimum (total present).....	(8)	5.5	(7)	70.9	(7)	13.5	(9)	5.45	(6)	67	(7)	13.5
Maximum (total present).....	(8)	6.45	(7)	75.4	(7)	15.1	(9)	6.4	(6)	77.4	(7)	15.2

*Maximum length of first metacarpal × 100
Maximum length of first metatarsal.

† Maximum length of first metatarsal × 100
Bicondylar length of femur.

LXXVIII. THE FIRST METATARSAL IN THE MUNSEE AND IN UNITED STATES WHITES

Both sexes	Right				Left			
	Specimens	Length, maximum	Hallux-femur index	Pollex-hallux index	Specimens	Length, maximum	Hallux-femur index	Pollex-hallux index
Munsee.....	(19)	cm. 6.3	14.3	72.3	(17)	cm. 6.2	14.15	71.1
United States whites*....	(51)	6.6	15.3	71.1	(33)	6.7	15.5	66.1

* The indexes in whites are close approximations.

Os Calcis

Being the largest bone of the tarsus, and the most important functionally, the os calcis, or calcaneus, seems to deserve closer attention by anthropologists than it usually receives.

The bone presents three different and fairly easily ascertainable dimensions: (1) the greatest length of the whole bone; (2) the minimum breadth or thickness of the body; and (3) the height of the body at its greatest constriction. It further offers several interesting points for visual observation.

The total number of calcanei in the Munsee material is 51, which gives a fair male and female series. The following table shows the measurements on 40 of those that are paired and hence most suitable for comparison.

LXXIX. MUNSEE BONES: OS CALCIS

MALES

	Specimens (pairs)	Length, maximum	Breadth, minimum of body *	Height of body †	Breadth-length index	Breadth-height index
		cm.	cm.	cm.		
Average.....	10	8.1	2.74	4.07	33.9	67.4
	10	8.05	2.72	4.07	33.87	66.9
Minimum.....	10	7.7	2.5	3.7	30.1	61.6
	10	7.5	2.45	3.8	28.1	62.2
Maximum.....	10	8.5	3	4.5	37.7	72.5
	10	8.5	3	4.5	37.3	73.7

FEMALES

Average.....	10	7.35	2.4	3.6	32.9	66.9
	12	7.3	2.38	3.6	33.1	66.4
Minimum.....	10	6.7	2	3.2	28.2	60.6
	12	6.7	1.95	3.3	28.7	59
Maximum.....	10	7.7	2.65	3.8	34.7	71.6
	12	7.8	2.65	3.9	34.3	70.4

* Branches of *compas glissière* applied to the sides of the bone in the region of minimum thickness of the body.

† Maximum height at greatest constriction of body, obtained by moving the bone from side to side between the points of the branches of the *compas glissière*.

It will be observed that, as is usual with other parts of the skeleton, the male bone is somewhat larger than the female; also that the right os calcis averages very slightly larger than the left in length and breadth, but is equal in both sexes to that of the left side in height. Reducing the three average measurements to a mean diameter, or module, we obtain for the males on the right, 4.97 cm.; on the left, 4.95 cm.; for the females, right, 4.45 cm.; left, 4.43 cm. showing that the difference in the mass of the bones on the two sides is very small.

The three measurements of the os calcis give rise to two indexes: one expressing the percental relation between its breadth and length, the other showing a similar relation between its breadth and height. The breadth-length index is somewhat higher in the males than in the females, but in the paired bones does not differ very appreciably on the two sides. Taking all the bones, as in the next table, we see that the index in the males predominates slightly over that in the females, which, judging from the constancy of the condition in the several series of specimens used for comparison, is probably also the true condition in the Munsee. It indicates a tendency in the males toward not only absolutely but also relatively slightly thicker calcaneus.

The breadth-height index, like the breadth-length proportion, is also slightly higher on both sides in the males than in the females, and in both sexes on the right than on the left side. As the height is the same on the two sides, this shows exactly the slightly greater relative thickness of the bone in the males than in the females, and on the right than on the left side. The phenomenon is doubtless connected with difference of stress to which the bone is subjected in the two sexes and on the two sides of the body.

The comparative data given in the following table show that, as with many other bones of the body, the os calcis in the Munsee and in other Indians in both sexes, and especially in the males, is smaller in all dimensions than it is in the whites. The relative proportions of the bone are quite alike in the different racial groups of males, but differ in an interesting way in the females, in which, among the whites, the bones show lower indexes than in the other groups. The white female os calcis is longer and higher, but equal in slenderness to that of the Indian.

LXXX. OS CALCIS: COMPARISON

MALES

Group	Number of specimens	Length, maximum	Breadth, minimum of body	Height, minimum of body	Module	Breadth-length index	Breadth-height index
		cm.	cm.	cm.	cm.		
Munsee.....	(29)	8.07	2.77	4.04	4.76	34.1	67.9
Arkansas and Louisiana.....	(34)	8	2.75	3.97	4.91	34.5	69.3
Southern Utah cliff-dwellers.....	(50)	7.72	2.81	4.05	4.86	36.4	69.4
Southwest and Mexico.....	(16)	7.85	2.67	4.01	4.84	34	66.5
United States whites.....	(55)	8.33	2.85	4.20	5.13	34.1	67.7

FEMALES

Munsee.....	(22)	7.3	2.4	3.6	4.43	32.6	66.2
Arkansas and Louisiana.....	(12)	7.3	2.45	3.5	4.42	33.7	70.3
Southern Utah cliff-dwellers.....	(30)	6.92	2.43	3.56	4.30	35.1	68.3
Southwest and Mexico.....	(13)	7.1	2.4	3.43	4.31	33.8	70.1
United States whites.....	(30)	7.87	2.43	3.81	4.71	30.9	63.7

Articular Facets for Astragalus

As to visual observations on the os calcis, the greatest interest attaches probably to the number and conformation of the articular facets for the astragalus. These facets may be two in number, anterior and posterior. But the anterior facet may be divided into two by a ridge; or it may be replaced by two facets, anterior and median, completely separated by a narrow to moderately broad groove or space; or, finally, in place of the single oblong anterior facet there may be a small to rudimentary anterior and a medium sized median facet, separated by a broad and deep notch.

The percental distribution of these facets among the Munsee, the Arkansas and Louisiana mound Indians, and the United States whites, is given below. There is a remarkable similarity in the frequency of occurrence of the two main forms (two and three facets) in all three groups among the males, but the females show slight irregularity.

LXXXI. OS CALCIS: MUNSEE AND COMPARATIVE: ARTICULAR FACETS FOR ASTRAGALUS

Group	Male			Female		
	Specimens	Two facets	Three facets	Specimens	Two facets	Three facets
		Per cent	Per cent		Per cent	Per cent
Munsee.....	(31)	26	74	19	48	52
Arkansas and Louisiana.....	(39)	26	74	33	37	63
United States whites.....	(55)	25.5	74.5	30	40	60

The agreement above set forth might lead us to suppose that practically no racial differences are connected with the facets, at least between the whites and some of the Indians; but this assumption is not borne out by a detailed study of these characters. The next table shows the more detailed observations on the number and character of these facets in the Munsee and in whites, and also with reference to sex and side. Here we notice, in the first place, that the frequency of two facets only is much higher in both groups in the females than in the males, while three facets are correspondingly more frequent in the males. But we observe further that the condition of three facets in which the anterior and median are separated by a wide notch is very much more frequent among the whites than among the Indians.

As to sides, differences between the right and left are irregular; if we combine the two series of Munsee and whites they almost disappear.

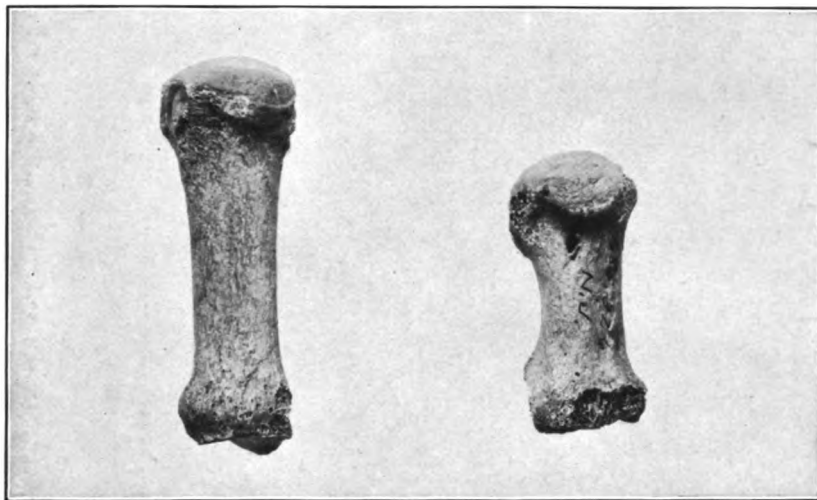
LXXXII. OS CALCIS IN THE MUNSEE AND IN UNITED STATES WHITES: ARTICULAR FACETS FOR ASTRAGALUS

	Specimens	Two facets	Three facets, but the two anterior separated only by a ridge	Three facets completely disconnected	Three facets, disconnected, with a wide notch between the anterior two
Males:		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Munsee.....	(31)	25.8	19.4	35.5	19.4
United States whites.....	(55)	25.5	7.3	29.1	38.2
Females:					
Munsee.....	(29)	48.3	10.3	41.4	.....
United States whites.....	(30)	40	16.7	20	23.3
Right:					
Munsee.....	(31)	42	6.5	42	9.7
United States whites.....	(51)	29.4	15.7	21.6	33.3
Left:					
Munsee.....	(29)	31	24	34.5	10.3
United States whites.....	(34)	32.4	2.9	32.4	32.4

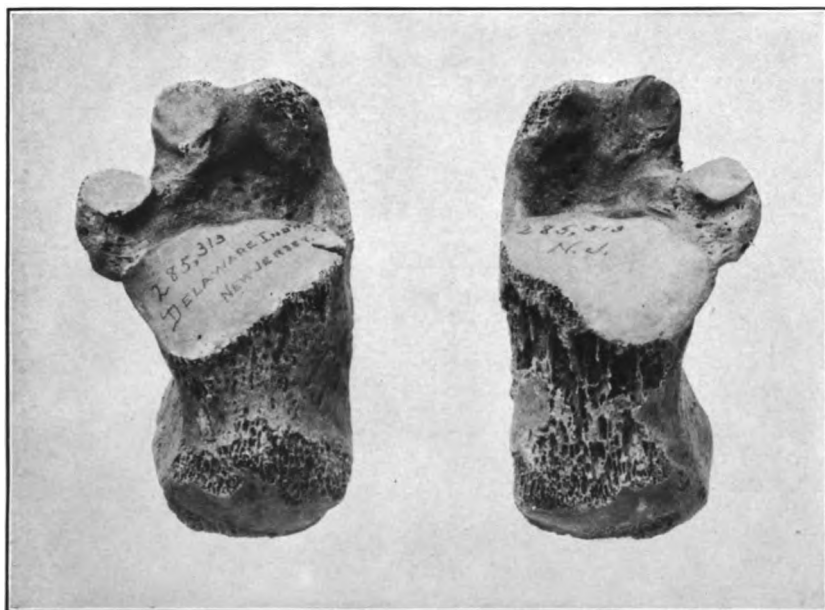
An additional point of some interest in connection with the calcaneus is the development of the peroneal spine. Among the Munsee this was found frequently to be very moderate and never pronounced; among the whites, cases with a much more marked development of the spine are met with occasionally, especially among the males.

Astragalus

Next to the calcaneus, the most interesting bone of the tarsus is the astragalus. The bone exhibits wide and characteristic variations



" THE RIGHT AND LEFT FIRST METATARSAL OF MUNSEE SKELETON NO. 285,326, U.S.N.M., SHOWING DISPROPORTION IN SIZE; ALSO A CANAL IN THE SMALLER BONE, POSSIBLY THE VESTIGE OF AN EARLY FRACTURE



b THE CALCANEI OF MALE MUNSEE SKELETON NO. 285,313, U.S.N.M., SHOWING WIDE SEPARATION OF THE TWO FACETS FOR THE ASTRAGALUS

among the higher mammals and may well be expected to show some groupal differences in man. It yields itself to three measurements, the maximum length, breadth, and height, from which in turn we obtain the module or mean diameter, useful in comparing the size of the bone, and the breadth-length and breadth-height indexes, which show its shape.

There are 60 astragali in the Munsee material, and the measurements of 52 paired bones are given below. They show the bone in the male to be absolutely larger in every dimension than in the female. As to the side, there is practically no difference among the males, but among the females the average measurements of the left astragalus are all slightly higher than those of the right bone. The module is practically identical on the two sides in the males, and slightly higher

LXXXIII. MUNSEE: ASTRAGALUS

MALES

	Specimens (pairs)	Right					
		Length, maximum *	Breadth, maximum †	Height, maximum ‡	Module	Breadth-length index	Height-length index
Average.....	(12)	cm. 5.7	cm. 4.27	cm. 3.27	cm. 4.41	74.9	57.4
Minimum.....		5.3	4.1	3.05	4.41	70.7	54.7
Maximum.....		6.2	4.6	3.5	4.41	88.3	62.5

	Length, maximum	Breadth, maximum	Height, maximum	Module (mean diameter)	Breadth-length index	Height-length index
Average.....	cm. 5.7	cm. 4.28	cm. 3.25	cm. 4.41	75.1	57.1
Minimum.....	5.3	4.05	3.05	.....	72.3	53.8
Maximum.....	6.3	4.7	3.5	.....	79.2	60.7

FEMALES

	Specimens (pairs)	Right					
		Length, maximum *	Breadth, maximum †	Height, maximum ‡	Module	Breadth-length index	Height-length index
Average.....	(14)	cm. 5.19	cm. 3.9	cm. 3	cm. 4.02	75	57.8
Minimum.....		4.7	3.5	2.7	4.02	70.5	54.4
Maximum.....		5.7	4.1	3.3	4.02	83.7	62.3

* Stem of calipers applied to lowest (most prominent) parts on medial surface of the bone.

† Distal branch of calipers applied to lowest (most prominent) parts on medial surface of the bone.

‡ On osteometric plane (Broca), all three lowest points of inferior surface of the bone touching the vertical board while the square is applied to the most prominent part of the bone from the opposite direction.

LXXXIII. MUNSEE: ASTRAGALUS—Continued

FEMALES

	Left					
	Length, maximum	Breadth, maximum	Height, maximum	Module (mean di- ameter)	Breadth- length index	Height- length index
	cm.	cm.	cm.	cm.		
Average	5.22	3.93	3.03	4.06	75.2	58
Minimum	4.8	3.6	2.7	.....	69.9	52.8
Maximum	5.7	4.15	3.4	.....	83.7	61.5

on the left in the females. As to the relative proportions, there is great similarity between the two sexes, as well as on the two sides of the body.

The results presented in this table would not be wholly satisfactory without the possibility of comparing them with similar observations, obtained by the same methods, on the bones of the whites. Such comparative data, furnished in the next table, show a number of points of considerable interest. In the first place, as with the calcaneus and other parts of the skeleton, the Munsee bones are seen throughout to be of more moderate dimensions than the bones of the whites. The module in the latter is very perceptibly higher.

There are, however, also notable differences in the relative proportions of the bones in the two races. Among the whites in both sexes the astragalus is relatively longer and also higher than it is among the Indians, as a result of which both of the indices of the bone in the whites are lower. The differences in this respect are too large and regular to be accidental.

LXXXIV. ASTRAGALUS IN THE MUNSEE AND IN UNITED STATES WHITES

MALES

Group	Specimens	Length, maximum	Breadth, maximum	Height, maximum	Module	Breadth- length index	Height- length index
		cm.	cm.	cm.	cm.		
Munsee.....	(24)	5.7	4.28	3.26	4.42	75.0	57.2
United States whites	(50)	6.29	4.48	3.32	4.7	71.2	52.8

FEMALES

Munsee.....	(28)	5.2	3.91	3	4.04	75.1	57.9
United States whites	(33)	5.75	4.02	3.11	4.29	69.8	54

In the examination of the os calcis, special attention was directed to its facets, especially the middle and anterior, for the astragalus. Inspection of the corresponding facets on the astragalus shows that these do not harmonize fully with those of the os calcis. They are less differentiated and more frequently connected or fused. Thus we have among 60 Munsee astragali, 28, or approximately 47 per cent

which show only one facet corresponding to the anterior and middle facets of the calcaneus, without any dividing line; 29, or 48 per cent, with one facet divided more or less completely by a ridge; and only three specimens, or 5 per cent, in which there are two distinct facets, though in but one of these are they separated by a moderate space. In the astragalus of the whites the proportions of these different forms are by no means the same as in the Munsee. Thus among 82 bones there are but 24, or 29 per cent, with one facet not divided by any ridge; 35, or 43 per cent, with one facet divided by a ridge; and no fewer than 23, or 28 per cent, of those in which there are two distinct facets, in 19 of which they are completely separated by a narrow to moderate space. The frequency of two facets well separated is therefore much greater among the whites than among the Munsee, which is another interesting distinction in the astragalus of these two groups and possibly of the two races which they represent. This is the more remarkable as no corresponding difference has been found in the facets on the os calcis.

Scaphoid

There are three additional bones of the tarsus which deserve somewhat detailed scrutiny, namely, the scaphoid or navicular, the cuboid, and the internal cuneiform. Although irregular in shape, each one of these bones yields to three measurements, which differ in the two sexes as well as racially, and each presents a number of points for observation.

The measurements taken by the writer on the scaphoid as well as on the other tarsal bones are, it may be repeated, the most practicable ones, and relate as closely as possible to the three principal dimensions of the specimens. In the case of the scaphoid they are the greatest breadth, height, and stoutness.

The results of the measurements of the scaphoid in the Munsee appear in the next table. The bone in the male is very perceptibly larger than that in the female, and that of the right foot is in both sexes and in all dimensions somewhat larger than that of the left. These conditions are shown nicely by the module or mean diameter of the bone.

The three measurements give rise to two indexes, which indicate the relative proportions of the scaphoid. The height-breadth index is somewhat larger on both sides in the females than in the males, which, as will readily be seen by reference to the actual dimensions, is due to the relatively greater breadth of the Munsee scaphoid in the males. No special difference is observable on the two sides of the body in the males, but in the females the right bone is relatively higher than the left.

The stoutness-breadth index offers no special differences either on the two sides or in the two sexes.

LXXXV. MUNSEE: SCAPHOID

MALES

	Right						
	Number of specimens, pairs	Breadth,* maximum	Height,† maximum	Stoutness,‡ maximum	Module (mean diameter)	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Average	(6)	4.20	2.11	2.61	2.98	50.2	62.3
Minimum		3.9	1.9	2.5	2.86	48.4	62.2
Maximum		4.55	2.2	2.85	3.2	55.4	64.1

	Left						
	Number of specimens	Breadth	Height	Stoutness	Module (mean diameter)	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Average	(6)	4.05	2.04	2.55	2.88	50.4	63
Minimum		3.65	1.7	2.45	2.6	46.6	60.5
Maximum		4.5	2.25	2.75	3.16	53.7	67.1

FEMALES

	Right						
	Number of specimens, pairs	Breadth,* maximum	Height,† maximum	Stoutness,‡ maximum	Module (mean diameter)	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Average	(6)	3.75	1.96	2.35	2.69	52.2	62.7
Minimum		3.5	1.75	2.25	2.59	48.1	60
Maximum		4.05	2.15	2.5	2.85	56.1	66.7

	Left						
	Number of specimens	Breadth	Height	Stoutness	Module (mean diameter)	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Average	(6)	3.72	1.89	2.31	2.64	50.8	62.2
Minimum		3.4	1.7	2.15	2.43	45.7	50.8
Maximum		4.05	2.05	2.45	2.97	55.4	68

* From the extremity of the tuberosity ad maximum.

† Use calipers with broad branches; hold instrument vertical; lay bone on movable branch on talus facet and raise the branch until the bone touches the under surface of the immovable branch.

‡ Same instrument as for last; lay bone on movable branch on its dorsal or superior surface; let it assume a natural position and raise the branch until the most prominent part of the plantar surface of the bone touches the under surface of the movable branch.

A comparison of the measurements of the Munsee scaphoid with those obtained on the United States whites shows a number of interesting conditions. The bone in the whites is again in both sexes and in all dimensions somewhat larger than in the Indian. The height-breadth index is identical in the females of the two races, but is more elevated, owing to a relatively greater height of the bone, in the white than in the Munsee males. The stoutness-breadth index is decidedly higher in both sexes in the whites, though more particularly so in the males. It may therefore be stated that the scaphoid in the United States whites is, in both sexes, not only absolutely but also relatively stouter, and in the males also relatively somewhat higher, than that in the Munsee Indians.

LXXXVI. SCAPHOID IN MUNSEE AND IN UNITED STATES WHITES

MALES

	Number of specimens	Breadth	Height	Stoutness	Module	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Munsee	(19)	4.13	2.08	2.59	2.93	50.4	62.8
United States whites	(52)	4.33	2.23	2.96	3.17	51.5	68.5

FEMALES

	Number of specimens	Breadth	Height	Stoutness	Module	Height-breadth index	Stoutness-breadth index
		cm.	cm.	cm.	cm.		
Munsee	(19)	3.75	1.94	2.35	2.68	51.7	62.7
United States whites	(36)	3.94	2.03	2.54	2.84	51.6	64.3

An inspection of the Munsee scaphoid shows a number of interesting particulars. A facet for the cuboid is present in only 23.5 per cent of the cases (15 per cent males and 30 per cent females); among the United States whites its frequency is nearly twice as great, or 39 per cent (40 per cent males and 37 per cent females), and Manners Smith reported an even higher proportion in England.¹

The facet for the talus differs quite markedly as to shape in the Munsee and the whites. In the whites, and particularly in the females, it is predominantly more or less pyriform, and only seldom quadrilateral or nearly so; while in the Munsee conditions are reversed and a more or less quadrilateral facet is present in a large majority of the cases, especially in the males, while the pyriform type is scarce.

The tuberosity of the scaphoid differs also somewhat in the two races. In general, it may be more or less pointed, or decidedly blunt, or squarish; the first two forms are common among the whites, while

¹ Quoted by Cunningham, *Anatomy*, 3d ed., p. 245.

the squarish or angular, rare in the whites, is not infrequent in the Indians. (See pl. 28, *d*.)

The processus plantaris is found generally to be quite pronounced in the Munsee, more frequently so than in the United States whites; and occasionally there exists in the Indian scaphoid an additional tuberosity, separated from the regular one by a groove continuous with that situated between the processus plantaris and the tuberosity.

Cuboid

The cuboid bone, though so irregular, can be fairly conveniently measured as to its maximum length, breadth, and thickness. The method of taking the dimensions is explained in the next table.

There are 19 pairs of cuboids in the Munsee material—9 male and 10 female. Their measurements show the usual predominance of the male bone over the female on both sides and in all dimensions; as to sides, however, the differences are very small, the mean diameter being, in fact, equal on the right and left in both sexes.

LXXXVII. MUNSEE: CUBOID

MALES

	Right						
	Number of specimens (pairs)	Length, maximum*	Breadth, maximum†	Thickness, maximum‡	Module (mean diameter)	Breadth-length index	Thickness-length index
		cm.	cm.	cm.	cm.		
Average.....	(9)	3.77	2.85	2.5	3.04	75.7	64.5
Minimum.....		3.55	2.7	2.3	2.88	70	62
Maximum.....		4	3.15	2.65	3.18	79.7	69.4

	Left						
	Number of specimens (pairs)	Length, maximum	Breadth, maximum	Thickness, maximum	Module (mean diameter)	Breadth-length index	Thickness-length index
		cm.	cm.	cm.	cm.		
Average.....	(9)	3.74	2.85	2.53	3.04	76.2	67.7
Minimum.....		3.55	2.75	2.3	2.86	71.8	62.8
Maximum.....		3.95	3	2.65	3.13	80	74.3

* Between the most prominent points on the superior and inferior borders of the distal or metatarsal facet of the bones and the point of the bone at the inferior medial angle ("calcaneal process").

† Maximum breadth, with the cuboid resting on its medial surface in such position as it naturally assumes. This and the measurement given in the next note are obtained readily by the *compas glissière* with broad branches.

‡ Maximum thickness, with the cuboid resting on its anterior surface in such position as it naturally assumes.

LXXXVII.—MUNSEE: CUBOID—Continued

FEMALES

	Right						
	Number of specimens (pairs)	Length, maximum	Breadth, maximum	Thickness, maximum	Module (mean diameter)	Breadth-length index	Thickness-length index
		cm.	cm.	cm.	cm.		
Average.....	(10)	3.54	2.66	2.26	2.82	75.1	64
Minimum.....		3.25	2.3	2.1	2.58	67.6	59.5
Maximum.....		3.85	2.95	2.4	3.03	81.5	67.7

	Left						
	Number of specimens	Length, maximum	Breadth, maximum	Thickness, maximum	Module (mean diameter)	Breadth-length index	Thickness-length index
		cm.	cm.	cm.	cm.		
Average.....	(10)	3.55	2.65	2.26	2.82	74.4	63.6
Minimum.....		3.25	2.35	2.1	2.65	67.1	59.7
Maximum.....		4.8	2.95	2.5	3.03	81.5	71.4

As in the case of the scaphoid, the three measurements of the cuboid give rise to two indexes which express the relative proportion of the bone. Both of these indexes, as seen by the table, are higher in the males than in the females, especially on the left side, showing that the male bone is relatively broader as well as thicker.

The indexes also show slight differences on the two sides, but these are not parallel in the two sexes; in the males both are slightly higher on the right side, while in the females the condition is reversed owing to the fact that while in the males the length of the bone is slightly less on the left, in the females it is slightly greater on that side than on the right.

The Munsee cuboid contrasted with that of the United States whites is, as in all the other bones of the tarsus, slightly smaller in every dimension, and it differs also from the latter to a moderate degree in its relative proportions; but these differences, as seen in the following table, are somewhat irregular and can not be regarded as established before a larger series of specimens is examined.

LXXXVIII. THE CUBOID IN MUNSEE AND IN UNITED STATES WHITES

MALES

	Number of specimens	Length	Breadth	Thick- ness	Module	Breadth- length index	Thickness- length index
		cm.	cm.	cm.	cm.		
Munsee.....	(22)	3.75	2.85	2.52	3.04	75.8	67.1
United States whites.....	(48)	3.96	3.02	2.59	3.19	76.3	65.6

FEMALES

Munsee.....	(24)	3.51	2.63	2.26	2.80	75	64.3
United States whites.....	(36)	3.62	2.67	2.37	2.89	73.7	65.5

As to points for observation, some interest attaches to the cuneiform and talus facets. In the United States whites the facet for the external cuneiform is single in 70 per cent of the cases, divided by a well-marked ridge in 23 per cent, and double, though mostly connected, in 7 per cent of the specimens. In the Munsee, in 45 bones, a single facet is present in 42, or 93 per cent; and one with a ridge in three, or approximately 7 per cent, while two facets occur in no instance.

In the United States whites a facet for the talus was found by the writer in four specimens out of the 82 examined, or approximately 5 per cent. Among 44 cuboids of the Munsee it occurred in only one instance (2.3 per cent), and in this case it was small.

The anterior or metatarsal facet of the cuboid is on the average flatter in the whites than in the Munsee, especially from side to side and in the bones of the males.

Internal Cuneiform

The internal cuneiform is the largest of the cuneiforms and yields two measurements—the greatest height and smallest breadth—which with their indexes are suitable for comparison. There are 45 of these bones in the Munsee material.

The results of the measurements, given in the next table, show the bone in the males to be as usual somewhat larger than in the females. With respect to the sides, the left bone is as high as and very slightly broader than the right in the males (in paired bones); but in the females the left internal cuneiform is very slightly lower and more perceptibly narrower than the right.

The breadth-height index on both sides is higher in the females, which shows that in this sex the bone is not only absolutely but also relatively lower than in the males.

LXXXIX. MUNSEE: INTERNAL CUNEIFORM

MALES

Right				Left			
Number of specimens	Height, maximum*	Breadth†	Breadth-height index	Number of specimens	Height, maximum	Breadth	Breadth-height index
Average:	cm.	cm.			cm.	cm.	
Pairs (8) ..	3.2	2.27	70.8	(8)	3.2	2.29	71.6
All (9) ..	3.17	2.24	70.7	(12)	3.17	2.3	72.7
Minimum (all) (9) ..	2.9	2.05	66.7	(12)	3	2.15	65.2
Maximum (all) (9) ..	3.35	2.4	77.4	(12)	3.35	2.55	79.7

FEMALES

Average (11) ..	2.86	2.11	73.8	(11)	2.84	2.06	72.6
	2.86	2.11	73.8	(13)	2.86	2.08	73
Minimum (11) ..	2.6	1.95	68.9	(13)	2.6	1.9	70
Maximum (11) ..	3.05	2.4	80	(13)	3	2.3	78.6

* Lower (proximal) branch of the calipers applied to the most prominent parts of the inferior surface of the bone.

† Breadth minimum, in middle of bone, upper branch of calipers resting on both lips of the scaphoid facet: the only practicable breadth in all specimens.

A comparison of the internal cuneiform in the Munsee and in the United States whites shows the bone in both sexes of the latter to be greater in height as well as in breadth. But, as indicated by the indexes, this bone in the whites is in general also relatively higher than in the Indians, as the result of which we have a lower index in the whites in both sexes. This reveals another interesting difference in the osteology of the two groups, which may prove to be of definite racial significance.

The relatively greater narrowness of the internal cuneiform in the female than in the male is equally well pronounced in the whites and in the Munsee, and is probably a universal characteristic.

XC. THE INTERNAL CUNEIFORM IN THE MUNSEE AND IN UNITED STATES WHITES

Males					Females			
	Specimens	Height	Breadth	Breadth-height index	Specimens	Height	Breadth	Breadth-height index
		cm.	cm.			cm.	cm.	
Munsee.....	(21)	3.17	2.28	71.8	(24)	2.86	2.10	73.4
United States whites.....	(50)	3.48	2.43	69.9	(37)	3.16	2.24	71.1

In descriptive features the internal cuneiform of the Munsee offers only minor differences from that of the whites. There seems to be present in the Indians, however, a somewhat greater tendency toward the occurrence of a double anterior or metatarsal facet. Two distinct

facets are present in five of the 45 Munsee bones (11 per cent), as against only one in the 87 bones of the whites (1.1 per cent). On the other hand, an approach to two facets (hour-glass shape, or a division of the one facet by a ridge) occurs in the Munsee in a little more than 13 per cent of the specimens, and in the whites in a little more than 10 per cent.

External and Middle Cuneiform

The external and middle cuneiform bones in the Munsee resemble closely those of the whites, but average slightly smaller in size.

Among 35 external cuneiforms, 10, or approximately 30 per cent, show absence of the facet for the fourth metatarsal, and one an absence of both facets for the second metatarsal.

As to the middle cuneiform, the central ligamentous depression on its medial surface, and especially the canal running downward from this, are characteristic features of the Indian bone and are more pronounced in both sexes than is the average in whites.

SUMMARY OF MEASUREMENTS AND OBSERVATIONS ON PARTS OF THE MUNSEE SKELETON OTHER THAN THE SKULL

The bones of the Munsee skeleton agree closely, in a general way, with those of other Eastern Indians. Contrasted with those of whites they present many close resemblances, but also certain marked differences, one of which being that they are less stout.

Humerus.—The mean length of the humerus is in no way exceptional. In the female this bone is relatively long. The right and left humeri are of the same length in males, but the left is slightly shorter than the right in females. The shaft is flatter than in whites, in consequence of which the shaft index is lower. The breadth or antero-posterior diameter of the shaft of the right bone is greater than that of the left, while the thickness is practically the same. The shape of the shaft is frequently plano-convex (juvenile). Perforation of the septum exists in 22 per cent of the males and in 59 per cent of the females. Of the supracondyloid process there are only slight traces.

Radius.—The radius is decidedly long in the Munsee in relation to the humerus in both sexes, the result of which is a high radio-humeral index. The right and left radii are of equal length in males, but, as with the humerus, the left radius averages slightly shorter in the females.

Ulna.—The ulna presents nothing exceptional; it is shorter on the right in females, as in the case of the radius.

Femur.—The form of the femur is generally ordinary. The length corresponds to the average stature of 167 cm. in males and 156 cm. in females.

The excess of maximum over bicondylar length is greater than in whites, indicating greater obliquity of axis. The relation in length of the female femur to that of the male is very nearly the same as in whites; and the same applies to the relation of the femoral to humeral length.

At the middle of its shaft the femur is slightly broader on the right side than on the left, in consequence of which the shaft index is higher on the left. This index is decidedly smaller in both sexes of the Munsee than in whites, owing to the lesser breadth of the shaft in the Indian.

The subtrochanteric flattening is quite pronounced, giving a platymeric index considerably below that of the whites, but agreeing with that in other Indians. The index is lower on the left side than on the right, and slightly higher in females than in males.

The shape of the shaft is most frequently the ordinary prismatic. The elliptic type is rare. Cylindrical and four-surface types are absent.

The third trochanter in some form and degree exists in more than two-thirds of the bones, but is rarely pronounced.

Tibia.—The female Munsee tibia is not only absolutely but also relatively shorter than that of males; nevertheless, in both sexes the bone is relatively longer than in whites, in consequence of which the tibio-femoral index is high.

Platynemy is infrequent; in the females the shaft is stout in many instances. In the shape of the shaft there is a frequency of the four-surface type.

Fibula.—The shape of the fibula is most frequently lateral prismatic or fluted.

Clavicles.—The clavicle in the female is relatively short. The right clavicle is slightly longer than the left in the males, shorter in the females.

Sternum.—The manubrium is generally detached; the bone is of moderate dimensions; frequent minor asymmetries; rib facets irregular in number. Curvature and measurements moderate; sternum of female relatively shorter.

Scapula.—The scapula is smaller than that of ordinary whites, especially in height. Scapular index high, showing the bone to be relatively broad, particularly in the females. Infrascapular index also high, even by comparison with that in other Indians.

The shape of the body is mostly quadrilateral or pentagonal. The superior border is frequently semilunar. The scapular notch in the males is often deep or converted into a foramen.

Ribs.—The ribs show remarkable freedom from fractures. Cervical rib present in one instance, 22 ribs only in another. In three-fourths of the cases the first ribs are semilunar in form.

Spine.—The spine is of moderate regular development. There are several numerical and structural anomalies.

Sacrum.—The dimensions of the sacrum are close to those of white males, but the female Munsee sacrum is shorter. The sacral index is not far from that in whites.

The sacrum shows the presence of six segments in one-fifth of the cases. The curvature is moderate to medium, and begins rather frequently below the first segment.

Pelvis.—Innominate bones absolutely smaller but relatively broader in females than in males. Breadth-height index lower than in whites. The pelvis as a rule is free from deformation. Male pelvis larger and relatively higher than the female, giving higher height-breadth index. Pelvic cavity in no case abnormal, but differs considerably in measurements; in general it is relatively deep at the brim, as a result of which it gives a high brim index.

Short and other bones: Patellæ.—The patella averages somewhat smaller in size than in whites. Male bone larger than female, but no difference in either sex on the two sides. The male Munsee patella is relatively somewhat shorter than that of the whites. Frequency of vastus notch.

Bones of hand.—Very free from anomalies. Moderate dimensions throughout. Metacarpo-humeral index lower than in whites, indicating relatively small hand.

Bones of feet.—First metatarsal shorter, both absolutely and relatively to the femoral length, than in whites, indicating relatively smaller feet.

Os calcis.—Bones of the two sides almost equal in size; very slight excess on right. Male bone relatively stouter than female, giving higher breadth-length and breadth-height indexes. The bone is smaller in all dimensions than that in ordinary whites of similar stature. The female os calcis is shorter and lower, but as slender as that of the whites.

The numerical variation of the facets for the astragalus is much the same as in whites, but in the latter the anterior and middle facets are much more frequently wide apart.

Astragalus.—Smaller in all dimensions than in whites. Equal on the two sides in males, but slightly higher on the left than on the right in the females. This bone is not only absolutely but relatively shorter and lower than that among the whites.

The facets for the os calcis do not harmonize fully with those on the os calcis itself, being less differentiated and more frequently connected or fused.

Scaphoid.—The scaphoid is smaller than in whites, also relatively less stout and frequently relatively less high than in the whites. The right scaphoid is larger than the left.

Cuboid facets are less common than among whites, and the facet for the astragalus differs markedly in shape from that of the white scaphoid. There are likewise differences in tuberosity and in processus plantaris.

Cuboid.—The cuboid is smaller than in whites; differences in the relative proportions are irregular. The right and the left bone are about equal.

Racial differences exist in cuneiforms and talus facets.

Internal cuneiform.—Smaller than in whites, also relatively lower. The female bone is relatively narrower than the male; there are some differences as to side.

Relative frequency of double metatarsal facet.

Middle cuneiform.—The depression in the medial surface and also the canal running from this are more pronounced in both sexes than in whites.

II. EASTERN INDIAN CRANIA IN GENERAL

GENERAL OBSERVATIONS

In connection with the study of the Munsee and in order to clarify, if possible, the physical affiliations of this important group of the Lenape, the writer undertook an examination of all crania of the Eastern Indians that now exist in the collections of the United States National Museum, the Peabody Museum of American Archaeology and Ethnology at Cambridge, Phillips Academy at Andover, the American Museum of Natural History in New York, The Academy of Natural Sciences of Philadelphia, and the Valentine Museum at Richmond, in addition to a number of specimens sent to him from other institutions.¹ The total number of crania studied in the course of this investigation aggregated 253, of which 121 were of males and 132 of females.

Former records on American crania from Eastern Indians are scarce, and in most instances so imperfect or antiquated as to be of little value. The earliest data are those of Morton and Meigs,² based on the collections now in The Academy of Natural Sciences of Philadelphia. In 1862 Sir Daniel Wilson, of Toronto, published his *Pre-historic Man*, in two volumes, in the second volume of which he gives measurements of 39 male and 18 female Huron (Iroquois) skulls. Unfortunately these measurements are few in number, are recorded in inches, and were determined with instruments of whose character there is no record, although presumably they were such as had been used by Morton and Meigs. Later brief references to eastern Canadian crania by Dr. David Boyle will be found in the *Annual Archaeological Reports* of Ontario. In 1867 measurements of five Algonquian and Iroquois skulls were included by Dr. J. Barnard Davis in his *Thesaurus Craniorum* (pp. 224-5), and in 1879 a few measurements of four Huron skulls were given by Quatrefages and Hamy in their *Crania Ethnica* (parts 10-11, p. 472).

In 1880 there appeared, in the *Memoirs of the Boston Society of Natural History*, a paper of 10 pages, with 2 plates, by Lucien Carr, at that time assistant curator of the Peabody Museum at Cambridge, on the crania of New England Indians, in which measurements of 67 skulls are given; but, as the present writer found subsequently by

¹ See the Appendix, page 127.

² *Crania Americana, Catalogue*, and other contributions. See the bibliographies in the writer's *Physical Anthropology in America*, *Amer. Anthropologist*, 1914, xvi, pp. 508-554.

examination and remeasurement of some of the same specimens, the sexual identification, as well as the measurements, were too faulty to warrant their use in this report. During the same year there appeared *A List of the Specimens in the Anatomical Collections of the United States Army Medical Museum*, by Dr. George A. Otis, which gave measurements of hundreds of American crania, including a number from the Eastern states; but these measurements also in many instances were made imperfectly, so that the records can not be profitably utilized. Flower's *Catalogue* gives the measurements of one Mohawk skull. Virchow, in his *Crania Ethnica Americana*, includes no specimen from the central or northern states bordering on the Atlantic. In 1899 Dr. Frank Russell¹ published some observations and measurements on Indian crania, among which were included a number from the New England states, more particularly from Massachusetts; and finally, in 1902, the writer published his *Crania of Trenton*,² which gave measurements of all the Lenape skulls, as well as those of some other Eastern Indians, then known.³

All the specimens described by the American authors above mentioned and that could still be located (which was possible in a large majority of the cases), were reexamined, consequently the following records are based solely on the measurements and observations by the present writer. Important additional Huron material, which it was found impracticable to include in these studies, exists in the museum of Laval University at Quebec and in the Provincial Museum at Toronto.

The 283 crania here included are not distributed evenly over the Atlantic states. There are fairly representative series from eastern Canada, Massachusetts, New York, New Jersey, and Virginia, but only a few specimens from Connecticut, and very few from Delaware, Maryland, and Pennsylvania. The climatic conditions and the soil of the more southerly of these states are not favorable to the preservation of skeletal remains, which, moreover, were probably never very abundant. Furthermore, many of the specimens available for examination were found more or less damaged, so that not all the important measurements could be obtained. Owing to these conditions the present study must necessarily leave many points for future corroboration or correction; however, the results obtained

¹ *American Naturalist*, 1899, p. 33.

² *Bulletin Amer. Museum of Natural History*, xvi, pp. 23-62.

³ Just as this memoir is about to go to the printer, there appears a study, by Marian Vera Knight, on *The Craniometry of Southern New England Indians* (Yale Univ. Press, 1915, iv, pp. 1-36, 9 pl.), constituting a report on approximately 90 skulls, many of them imperfect, from Massachusetts and Rhode Island. A majority of the specimens are those that have already been studied by Carr and Russell, and more especially by the present writer. The results agree closely with those shown in this report, although Miss Knight includes some specimens that may safely be regarded as extraneous, and has not been entirely fortunate in the matter of some of her measurements and comparisons.

shed much light on the physical characteristics and relations of the Eastern Indians.

As above noted, the collections included cover the territory from southeastern Canada to Virginia, and, roughly speaking, from the easternmost lakes and the Appalachian mountains to the Atlantic. From northward and northwestward of this region skeletal material is scarce, and the same is true of the Southern states until we reach Florida; while to the westward the conditions are more complex and will best form part of a separate discussion.

The entire region covered by the collections, with a single exception, is characterized by a complete absence of both intentional and cradle-board deformation of the skull; the exception applies to the Munsee, among whom prevailed to a moderate extent the practice of frontal (fronto-occipital) compression. As this practice was very general to the southward and southwestward of the section here involved and was completely absent elsewhere beyond its boundaries, its occurrence among the Munsee, even to a limited extent, indicates that this tribe had some close connection in those directions, in which respect it differs from the rest of the Lenape. The well-known accession to the tribe, in the latter part of the seventeenth century, of some Shawnee, whose home was to the southwestward as far as Kentucky and Tennessee, may, as already suggested, explain this occurrence.

A consequential result of the study of the Eastern crania here included is that they all belong to one and the same fundamental type, which we now know in the northeast as that of the Algonquian and Iroquois, in the west as the Shoshonean, farther south as the Piman-Aztec, and in South America as the Andean, "Lagoa Santa," or Pampas type. However, in the territory under consideration, as elsewhere, this type is far from being homogeneous, differing sometimes in an important way almost from tribe to tribe. The differences are evidently due partly to intermixture with the other or brachycephalic American type and partly to locally developed or perpetuated variations.

In the several series of skulls here dealt with there is plain evidence of admixture in the majority of the groups, which, though mostly slight, increased from the north to the south. This admixture consists uniformly of brachycephalic elements, in some localities males, in others females, which doubtless were derived from farther west, southwest, and south. There are only four groups from which such admixture is absent, namely, those from Maine, Massachusetts, Connecticut, and Long Island. The conditions in this respect are presented in the following table:

XCI. PRESENCE OF BRACHYCEPHALIC INDIVIDUALS AMONG EASTERN TRIBES

Tribe or district	Males		Females	
	Skulls examined	Brachycephals in the group	Skulls examined	Brachycephals in the group
Hurons of southeastern Canada.....	15	2	5	.....
Maine.....	6	.....	6	.....
New Hampshire.....	.....	.....	1	.....
Massachusetts.....	14	.....	25	.....
Rhode Island.....	7	1	6	1
Connecticut.....	4	.....	4	.....
New York.....	19	.....	18	3
Manhattan Island.....	3	1	.....	.....
Long Island.....	7	.....	5	.....
Staten Island.....	6	2	3	.....
Munsee.....	10	.....	13	4
Other Lenape.....	11	3	23	3
Maryland.....	6	2	4	.....
Virginia.....	30	4	32	4
Total.....	138	* 15	145	† 15

* 10.9 per cent.

† 10.3 per cent.

In all these cases the brachycephaly, and frequently other features of the skulls, were such that they could not possibly be attributable to a mere fluctuation of the prevalent type.

The individuals whom such specimens represent were probably recent accretions by the tribes through marriage or adoption. Other increments of similar nature doubtless occurred in the past, and, blending more or less thoroughly with the tribes, modified the physical types of these to a greater or less extent. It is evidently due to this influence that, as will be shown later, the more southerly tribes of the region under consideration—those which were nearest the more westerly, southwesterly, and southerly brachycephals—show a higher cranial index than the more northerly and purer tribes.

The principal numerical results of the measurements derived from the Eastern Indian crania are given at the end of this section. These may be summarized briefly: The type is characterized by marked to moderate dolichocephaly in the males, and by moderate dolichocephaly to mesocephaly in the females; by medium to high vault, with occasionally a low forehead; by good size of the skull as a whole, and lack of unusual thickness of its bones; by moderately high to high face, the latter especially frequent in the males; by moderate, seldom great, breadth of face; by considerably varying orbital dimensions and index, with a predominance of mesoseme forms, but reaching, even in the averages, from microseme to megaseme; by the frequency of moderate size in the nasal aperture; by variable nasal index, with a large predomi-

nance, however, of the mesorhinc form; by a rather short palate in many instances; and by a moderate degree of facial as well as of alveolar prognathism.

CRANIAL INDEX

The distribution of the most important characteristic of the skulls, the *cranial index*, will be more clearly apparent from the next table. Owing to the paucity of crania in some of the series, there are irregularities between the males and females of the same group, and the position of the different groups in the line is probably not in every case correct. Nevertheless, certain conditions are clearly brought out. It is seen on the whole that the dolichocephaly decreases in a slight ratio from the north to the south; but its lower extreme is found on Long Island, Staten Island, and Manhattan Island, New York. The crania from these three localities show striking resemblances, and though there are also certain differences, the conclusion seems to be justified that they belong to one group. It has been suggested¹ that the Indians of Staten Island were a branch of the Lenape, but the evidence offered by the skeletal remains gives no corroboration of this. There may have been Lenape women, or even some Lenape admixture, in the Staten Island tribe, but the crania of the men show almost uniformly distinct features which identify them clearly with the Indians of Manhattan Island and Long Island.

XCH. EASTERN INDIAN CRANIA: CRANIAL INDEX

	Males		Females	
	Number of specimens	Index	Number of specimens	Index
Long Island.....	(7)	70.7	(5)	74.3
Manhattan Island.....	(2)	71.7	(1)	71.8
Staten Island.....	(4)	71.7	(3)	75.4
Connecticut.....	(4)	72.4	(4)	74.6
Maine.....	(6)	72.7	(6)	74.7
Massachusetts.....	(14)	72.8	(25)	74.7
Southeastern Canada.....	(14)	73.4	(5)	76.9
New York State.....	(19)	73.5	(15)	74.8
Maryland.....	(4)	73.6	(4)	74.0
Rhode Island.....	(6)	73.7	(5)	75.6
New Jersey (Heye collection).....	(4)	73.9	(5)	75.8
New Jersey (earlier).....	(6)	74.6	(19)	75.1
Virginia.....	(27)	75.5	(28)	76.3

There is remarkable similarity in the average index of the crania of all the more northerly states as far as New Jersey. The Indians of both sexes from Maine and Massachusetts are particularly close in

¹ See A. Skinner in *The Indians of Greater New York and the Lower Hudson*, edited by Clark Wissler, *Anthropological Papers of the American Museum of Natural History*, III, 1909.

this respect, and, as will be seen later, these two groups, while not entirely homogeneous, show many other close similarities.

The most important result is that shown by the crania from southeastern Canada, which are almost entirely Huron or Iroquois; and by the specimens from New York State, which also are largely of Iroquois derivation. The Iroquois, as is well known, are regarded as a linguistic stock distinct from the Algonquian, though there are some lexical resemblances in the two languages. But the measurements of the skulls of representatives of the two stocks show no such distinction. In fact, the Iroquois occupy, with reference to nearly all important cranial features, more or less of a median position among the Algonquian groups, and there is no basis on which they can legitimately be segregated as belonging to any different physical group of Indians. It is quite possible that some of the Iroquois tribes may have been derived, in smaller or larger part, from other peoples of the westward or the southwestward, or that in course of time they became mixed with such; but the greater proportion of the Iroquois can henceforth be no more separated in physical anthropology from the Algonquians than can any of the subgroups of the latter.

Another important result of these studies relates to the Lenape. The Munsee and other Delaware Indian skulls, while nearing (and in the case of females slightly surpassing) the upper limits of dolichocephaly, are nevertheless sufficiently closely related to the crania from the neighboring states to show that the Munsee, and the Lenape as a whole, were in all probability only subdivisions of the eastern Algonquians. Resemblances in other important features of the skull, as well as of the skeleton, make this conclusion quite definite, thus eliminating the theory of the migration of the Lenape from beyond the Mississippi, for if such were the case, they could scarcely fit so precisely into the anthropological position they occupy between the neighboring tribes. Yet, as previously mentioned, there is some evidence, especially that afforded by the Munsee, that the Lenape had some connection, probably earlier as well as recent, with tribes living southwestward from the Appalachian mountains.

From the limited Pennsylvania material it appears that the eastern lowlands were occupied by Indians of the Algonquian or Lenape type, while in the more westerly parts brachycephaly was frequent if not common.

As to the Virginia Algonquians, they show the highest cranial indexes of all the groups here considered, and had doubtless considerable foreign blood, derived from the west or the south. It would be interesting to compare the Virginia Indians with the Siouan tribes, to which they seem to bear close affinity.

HEIGHT OF SKULL

Next to the cranial index, the most important feature of the vault of the skull is its height, and the Eastern crania, as already stated, are characterized by good to pronounced development in this direction. The averages of the measurements, and those of the ordinary height-length and height-breadth indexes, will be found in the final tables, but none of these are very satisfactory for showing the true value of this dimension, which on the one hand is proportionate to the size of the skull, and on the other stands in a more or less compensatory relation with both the length and breadth of the vault. It has long been felt by the writer that some expression of the real relative value of the height measurement was required, and this need led him ultimately to compare it not with the very variable length or breadth of the skull, but with the mean of these two measurements. The resultant index, which may be called simply the height index of the vault, gives us a new means of comparison and classification of the skull and promises to prove much more satisfactory than the two older indexes. In the Eastern crania here described, it ranges from 83 to almost 90, and the arrangement of the various tribes on its basis is harmonious and of considerable interest. The main points brought out by the index are as follow:

In the northernmost tribes the height of the skull is on the whole relatively lower than in those farther south. The Munsee and other Lenape crania agree with those of the more northerly groups, but differ somewhat from each other, the skulls in the Heye collection being in both sexes perceptibly lower than those of the other Lenape. The Staten Island, Manhattan Island, and Long Island skulls are again grouped, so far as the more important male skulls are concerned, and are all high. Of the Virginia collections, the first series, from various eastern localities, shows a medium height or slightly above; but the Valentine collection, from a more westerly part of the state,¹ gives in both sexes the highest index of all the groups, showing the greatest relative height and indicating that this group had been subjected to influences which did not affect equally the Indian population of other parts of the state.

¹ For details concerning this collection, see Report of the Exploration of the Hayes Creek Mound, Rockbridge County, Virginia, *Publ. Valentine Museum*, Richmond (ca. 1892).

XCIII. EASTERN INDIAN CRANIA: HEIGHT INDEX*

	MALES		FEMALES	
	Number of specimens	Index	Number of specimens	Index
Maine.....	(6)	83	(6)	83.5
New Jersey (Heye collection).....	(4)	83.9	(5)	83.2
New York.....	(19)	84.4	(15)	83.6
Southeastern Canada.....	(14)	84.4	(5)	85.7
Massachusetts.....	(14)	84.6	(25)	86.1
Rhode Island.....	(6)	85.3	(5)	86.4
New Jersey (earlier).....	(6)	86.1	(21)	85.1
Virginia (miscellaneous).....	(12)	86.5	(7)	85.25
Connecticut.....	(4)	86.5	(4)	85.4
Staten Island.....	(4)	87.5	(3)	84.2
Manhattan Island.....	(2)	87.5	(1)	(88.4)
Long Island.....	(7)	88.1	(5)	84
Virginia (Valentine collection).....	(15)	89.8	(21)	86.7

$$*H \times 100 + \frac{(L+B)}{(2)}$$

SIZE OF SKULL

The size of the skull of the Eastern Indian, as expressed by the cranial module, shows again a grouping of much interest, though here more than in other series, owing to the small number of specimens, the position of some of the tribes can not be regarded as definitely fixed. The Munsee, as well as other Lenape skulls, stand with those of Rhode Island at the lower end of the scale, showing the smallest heads, although the Indians of these localities were not tribes of smaller stature than most of the other Eastern Indians. The more northerly Algonquians (with the exception of those of Rhode Island) and the Iroquois, occupy a median position. In the Virginia tribes the size of the skull ranges from medium to slightly above in the more easterly, but slightly below medium in the more westerly tribes. The crania from Manhattan, Long Island, and Staten Island are again grouped and occupy the highest position in the series, showing the largest heads; but they were also among the tallest, if not the tallest, of the Eastern Indians.

XCIV. EASTERN INDIAN CRANIA: CRANIAL MODULE

	Males		Females	
	Number of specimens	Cranial module	Number of specimens	Cranial module
		cm.		cm.
Rhode Island.....	(6)	15.22	(4)	14.84
New Jersey (earlier).....	(4)	15.33	(14)	14.64
New Jersey (Heye collection).....	(7)	15.44	(9)	14.75
Virginia (Valentine collection).....	(11)	15.46	(13)	15.0
Southeastern Canada.....	(14)	15.48	(5)	14.77
Maine.....	(6)	15.55	(5)	14.92
Connecticut.....	(2)	15.55	(3)	14.84
Massachusetts.....	(12)	15.56	(22)	14.72
Virginia (miscellaneous).....	(6)	15.58	(2)	14.74
New York State.....	(17)	15.62	(14)	14.71
Manhattan Island.....	(2)	15.67	(1)	14.93
Long Island.....	(5)	15.71	(5)	14.91
Staten Island.....	(4)	16.04	(3)	14.73

XCV. EASTERN INDIAN CRANIA: VAULT*

MALES

Group	Number of specimens	Length	Breadth	Height	Cranial module	Cranial index	Height-length index	Height-breadth index	Cranial capacity	Thickness left parietal
		cm.	cm.	cm.	cm.				c. c.	mm.
Southeastern Canada.....	(14)	18.84	13.82	13.78	15.48	73.4	73.1	99.7		
Maine.....	(6)	19.1	13.9	13.7	15.55	72.7	71.9	98.8		
Massachusetts.....	(14)	18.93	13.78	13.94	15.56	72.8	73.5	101		
Rhode Island.....	(6)	18.43	13.58	13.65	15.22	73.7	74.1	100.5		
Connecticut.....	(4)	18.65	13.5	13.9	15.55	72.4	73.5	100.4		
New York State.....	(19)	19	13.97	13.92	15.62	73.5	73.6	99.5		
Manhattan Island.....	(2)	19.05	13.65	14.3	15.67	71.7	75.1	104.8		
Long Island.....	(7)	19.1	13.5	14.36	15.71	70.7	74.9	105.7		
Staten Island.....	(4)	19.5	14	14.66	16.04	71.7	75.2	104.9		
New Jersey (earlier).....	(6)	18.5	13.8	13.9	15.33	74.6	75.8	101.2		
New Jersey (Heye collection).....	(7)	19.05	14.1	13.9	15.44	73.9	73.1	98.9	1544	5
Delaware.....	(1)	(19)	(14)			(73.7)				
Maryland.....	(4)	19.2	14.15	(13.6)	(15.57)	73.6	(71.6)	(96.5)		
Virginia (miscellaneous).....	(12)	18.6	14	14.1	15.58	75.5	76.2	99.3		
Virginia (Valentine collection).....	(15)	18.2	13.75	14.35	15.46	75.5	79	103.2		

*Measurements in parentheses are derived from a single specimen.

XCV. EASTERN INDIAN CRANIA: VAULT—Continued

FEMALES

Group	Number of specimens	Length	Breadth	Height	Cranial module	Cranial index	Height-length index	Height-breadth index	Cranial capacity	Thickness left parietal
		cm.	cm.	cm.	cm.				c. c.	mm.
Southeastern Canada.....	(5)	17.55	13.5	13.3	14.77	76.9	75.7	98.3		
Maine.....	(6)	18.1	13.5	13.2	14.92	74.7	73.4	97.8		
New Hampshire.....	(1)	(17.8)	(12.6)			(70.8)				
Massachusetts.....	(25)	17.7	13.2	13.3	14.72	74.7	75.5	100.9		
Rhode Island.....	(5)	17.8	13.45	13.5	14.84	75.6	76.6	100.2		
Connecticut.....	(4)	17.85	13.3	13.3	14.84	74.6	74.9	98.8		
New York State.....	(15)	17.8	13.3	13	14.71	74.8	72.5	96.6		
Manhattan Island..	(1)	(18.1)	(13)	(13.7)	(14.93)	(71.8)	(75.7)	(105.4)		
Long Island.....	(5)	18.1	13.45	13.25	14.91	74.3	73.2	98.5		
Staten Island.....	(3)	17.7	13.4	13.1	14.73	75.4	73.9	98		
New Jersey (earlier)	(21)	17.6	13.2	13.1	14.64	75.1	74.9	97	1326	
New Jersey (Heye collection).....	(9)	17.6	13.4	12.9	14.75	75.8	73.1	96.4	1285	4.3
Maryland.....	(4)	18.1	13.4		(14.87)	74	(70.1)	(97)		
Virginia (miscellaneous).....	(7)	17.7	13.5	13.3	14.74	76	75	100.7		
Virginia (Valentine collection).....	(21)	17.75	13.6	13.6	15	76.4	76.9	99		

FACIAL MEASUREMENTS

HEIGHT OF THE FACE

The height of the face stands largely, though not absolutely, in correlation with the length of the head, a feature which becomes apparent also in our series. The collections from more westerly Virginia and the Lenape groups, all of which show rather short crania, give also the shortest faces. Maine and Massachusetts follow, with Rhode Island and New York. The Indians of Staten Island, Long Island, and Manhattan Island, so far as the males are concerned, all find a place in the upper half of the series, with long faces, and the same is true of the few more easterly Virginia specimens in which the face could be measured, and of the males of southeastern Canada. The latter, with those of Manhattan Island, occupy the upper limit of the scale. The females throughout show more uniformity than the males in their measurements.

BREADTH OF THE FACE

The breadth of the face, as measured by the diameter bizygomatic maximum, stands in a measure in correlation with the breadth of the head, but as it depends very largely on the degree of development of the temporal muscles and as a pronounced development of these muscles, while broadening the zygomatic arches, tends at the same

time to restrict the development of the skull in breadth, there are many irregularities in this correlation. In our series, Rhode Island, Maine, Massachusetts, and Connecticut occupy the lowest positions in the scale, showing faces that for Indians are decidedly narrow. Among the Lenape the faces are about medium, and the same is true of the more westerly Virginians. On Manhattan Island and Staten Island the face was well above the medium in breadth, but not so on Long Island, although the somewhat exceptional position of the Long Island Indians in this respect may be accidental. The Indians of southeastern Canada and New York State, as well as some of the Virginia Indians, had faces decidedly broader than the averages of those of the northeastern states bordering on the Atlantic.

Comparing the average facial breadth with facial height, it is seen that in most of the tribes noted the two measurements occupy a similar position in the scale, the narrow faces being also short, and vice versa; but there are several exceptions.

XCVI. EASTERN INDIAN CRANIA: FACE

Prosthion-nasion height					Diameter bizygomatic maximum				
Group	Males		Females		Group	Males		Females	
	Number of specimens	P.-N.	Number of specimens	P.-N.		Number of specimens	D. biz. max.	Number of specimens	D. biz. max.
		cm.		cm.			cm.		cm.
New Jersey (Heye collection)	(7)	7.15	(5)	6.9	Rhode Island	(6)	13.35	(3)	13
New Jersey (earlier)			(11)	6.8	Maine	(2)	13.45	(4)	12.95
Virginia (Valentine collection)	(4)	7.3	(5)	6.9	Massachusetts	(7)	13.7	(8)	12.7
Maine	(3)	7.4	(4)	6.8	Connecticut	(2)	13.8	(2)	12.3
Massachusetts	(8)	7.4	(15)	7	Long Island	(4)	13.85	(4)	12.95
Rhode Island	(3)	7.4	(4)	7.1	Virginian (Valentine collection)	(4)	13.85	(6)	13.1
Connecticut			(2)	6.85	New Jersey (earlier)			(9)	12.7
New York State	(10)	7.4	(11)	6.9	New Jersey (Heye collection)	(7)	13.9	(6)	12.8
Staten Island	(3)	7.45	(2)	6.5	New York State	(13)	14.05	(9)	13.1
Virginia (miscellaneous)	(2)	7.5			Eastern Canada	(9)	14.1	(5)	12.6
Long Island	(4)	7.5	(4)	7	Manhattan Island	(1)	14.3		
Southeastern Canada	(7)	7.8	(5)	6.75	Staten Island	(3)	14.7	(2)	12.65
Manhattan Island	(2)	7.95			Virginia (miscellaneous)	(2)	14.7		

ORBITS

While describing, in 1902, the skulls of the more easterly Lenape, the writer was impressed by the occasional appearance of very low orbits, and considered at the time the possibility of this feature being characteristic of the tribe. The present examination shows,

however, that remarkably low orbits were frequent among some of the tribes of the eastern Algonquians, and that the Munsee and Lenape skulls occupy, with respect to the average orbital index, only a median position. The lowest orbits in the mean were found among the males of Long Island and of the North Atlantic states. Maine and Massachusetts again stand exceedingly close together, with fairly low indexes, while Manhattan Island and Staten Island are about medium. The females of Staten Island show in this, as in other respects, a lack of harmony with the males, with lower index. The highest orbits are found in the skulls from southeastern Canada and Rhode Island, and in both of the series from Virginia. On the whole, the extensive variation of the absolute and relative dimensions of the orbits among the eastern Algonquians (and Iroquois) is very remarkable. Its chief cause in the males is the unequal development of the supraorbital ridges; in the females, excepting in two or three groups, the proportions and indexes are more nearly alike.

XCVII. EASTERN INDIAN CRANIA: FACE

Group	Orbital index				Group	Nasal index			
	Males		Females			Males		Females	
	Number of specimens	O. I.	Number of specimens	O. I.		Number of specimens	N. I.	Number of specimens	N. I.
Long Island.....	(5)	82.6	(5)	87.4	Manhattan Island....	(2)	44.9	.....	.....
Connecticut.....	(2)	84.6	(3)	92.1	Maine.....	(4)	45.6	(4)	50
Maine.....	(4)	86.2	(4)	86.2	Long Island.....	(5)	46.7	(5)	49
Massachusetts.....	(10)	86.3	(2)	88.8	Connecticut.....	(2)	49	(2)	54.7
New York State.....	(16)	86.8	(13)	88.6	Southeastern Canada..	(8)	49.1	(5)	53.4
Manhattan Island....	(2)	87.4	(1)	87.8	Massachusetts.....	(10)	49.7	(20)	49.5
New Jersey (earlier) ..	.....	.....	(13)	87.2	Virginia (miscellaneous)	(3)	50.6	(1)	52
New Jersey (Heye collection) ..	(7)	87.5	(7)	91.7	New Jersey (earlier) ..	.....	.....	(13)	51.5
Staten Island.....	(3)	87.6	(3)	83	New Jersey (Heye collection) ..	(7)	51.1	(9)	52.9
Southeastern Canada..	(10)	87.8	(5)	89.5	New York State.....	(15)	51.8	(13)	53.2
Virginia (Valentine collection).....	(10)	87.9	(6)	89	Rhode Island.....	(6)	52.5	(5)	52.1
Virginia (miscellaneous).....	(5)	88.9	(2)	85.6	Staten Island.....	(3)	53.1	(3)	54.4
Rhode Island.....	(6)	90	(5)	89	Virginia (Valentine collection) ..	(8)	53.5	(6)	54.3

NASAL INDEX

Among the Eastern Indians, the nose, as already mentioned, is in general relatively small, and the aperture presents often fairly sharp borders, an exceptional feature among Indians of most other parts of the continent. The nasal aperture, or more properly the

relation of the breadth to the height of the nose, expressed by the nasal index, differs considerably in the different tribes. The index is low in the northeastern states, on Manhattan Island and Long Island, and in southeastern Canada; medium among the Munsee and other Lenape, among the more easterly Virginia tribes and in New York State; and elevated on Staten Island and in the more westerly Virginians. It was also elevated in both sexes in Rhode Island, which is of interest in that the specimens from that state show a somewhat exceptional position in other respects. On Staten Island, the crania of which stand in regard to nasal index apart from those of Manhattan Island and Long Island, with which they are otherwise so closely related, the character may have been influenced by admixture through the accession of females.

PALATE

The relative proportions of the dental arch, as expressed by the "palatine" index, show shortest palates in the northeastern states and longest among the Lenape; but the differences are not very marked.

XCH. EASTERN INDIAN CRANIA: FACE

Group	Palatine index				Group	Angle of facial prognathism			
	Males		Females			Males		Females	
	Number of specimens	P. I.	Number of specimens	P. I.		Number of specimens	Angle, degrees	Number of specimens	Angle, degrees
Massachusetts.....	(5)	113.2	(8)	115.4	Connecticut.....			(2)	68
Manhattan Island.....	(2)	113.2			Rhode Island.....	(3)	60	(2)	73
Maine.....	(3)	113.8	(4)	113.8	New York State.....	(7)	71	(10)	72.5
Virginia (Valentine collection).....	(3)	114.1	(5)	116.4	Southeastern Canada..	(5)	72	(3)	72
New York State.....	(2)	116			Maine.....			(3)	72
Rhode Island.....			(3)	116.1	Massachusetts.....	(4)	73	(3)	71
Staten Island.....	(2)	116.5			New Jersey (Heye collection).....	(6)	73	(5)	74
Southeastern Canada..	(4)	117.3	(3)	115.8	Long Island.....	(4)	74	(3)	71
New Jersey (Heye collection).....	(8)	120.7	(5)	120.5	Virginia (Valentine collection).....			(5)	74
New Jersey (earlier).....			(2)	121.2	Staten Island.....	(3)	76	(1)	75

PROGNATHISM

Facial prognathism did not differ very greatly in the different groups, yet there is a perceptible tendency toward a greater orthognathism among Indians of the northeastern states and Canada, and to somewhat greater protrusion among those of Long Island and Staten Island, the Munsee, and the Virginians of the Valentine collection. Alveolar prognathism (see table for details) was most

pronounced on Manhattan Island, Long Island, and Staten Island; east among the New York Indians and among those of southeastern Canada, Maine, and Massachusetts.

It is evident from the data presented above, that the eastern Algonquian (and Iroquois) Indians, while essentially of one type, approached purity of type much more in the northeastern Atlantic states and in southeastern Canada than farther south. It is further plain that the stock presented numerous and occasionally marked localized or tribal as well as individual variations, and that in several of the states, and possibly even in Rhode Island, it was modified more or less by admixture with individuals of both sexes from across the Appalachians or the south. A locally differentiated group which in many respects already stood more or less apart from the neighboring tribes and was also characterized especially by more than average development, is the cluster of tribes of Manhattan Island, Long Island, and Staten Island. The Munsee and other Lenape stand in close relation in many important respects, though they exhibit also some differences; and both of them, as already shown, agree with the rest of the eastern Algonquians, more especially with their immediate neighbors to the north and south.

The tables of detail measurements of the Eastern Indian crania follow.

XCIX. EASTERN INDIAN CRANIA: FACE (DETAILS)

MALES

Group	Number of specimens	Upper height	Facial breadth	Facial index, upper	Number of specimens	Orbits		
						Height	Breadth	Index
		cm.	cm.			cm.	cm.	
Southeastern Canada.....	(7)	7.8	14.1	55.2	(10)	3.47	3.96	87.8
Maine.....	(3)	7.4	13.45	53.2	(4)	3.36	3.9	86.2
Massachusetts.....	(8)	7.4	13.7	54.3	(10)	3.42	3.96	86.3
Rhode Island.....	(3)	7.4	13.35	55.5	(6)	3.5	3.9	90
Connecticut.....	(2)		13.8		(2)	3.25	3.8	84.6
New York State.....	(10)	7.4	14.05	51.7	(16)	3.4	3.9	86.8
Manhattan Island.....	(2)	7.95	(14.3)	(54.5)	(2)	3.47	3.97	87.4
Long Island.....	(4)	7.5	13.85	54	(5)	3.3	4	82.6
Staten Island.....	(3)	7.45	14.7	50.5	(3)	3.48	4	87.6
New Jersey (Heye collection).....	(7)	7.15	13.9	51.5	(7)	3.4	3.9	87.5
Maryland.....					(1)	(3.48)	(3.98)	(87.4)
Virginia (miscellaneous).....	(2)	7.5	14.7	51	(7)	3.55	4	88.9
Virginia (Valentine collection).....	(4)	7.3	13.85	56	(10)	3.33	3.8	87.9

XCIX. EASTERN INDIAN CRANIA: FACE (DETAILS)—Continued

FEMALES

Group	Number of specimens	Upper height	Facial breadth	Facial index, upper	Number of specimens	Orbits		
						Height	Breadth	Index
		cm.	cm.			cm.	cm.	
Southeastern Canada.....	(5)	6.75	12.6	52.9	(5)	3.38	3.78	89.5
Maine.....	(4)	6.8	12.95	52.7	(4)	3.28	3.81	86.2
Massachusetts.....	(15)	7	12.7	56.2	(21)	3.36	3.79	88.8
Rhode Island.....	(4)	7.1	13	55.2	(5)	3.45	3.87	89
Connecticut.....	(2)	6.85	12.3	55.7	(3)	3.32	3.6	92.1
New York State.....	(11)	6.9	13.1	52.9	(13)	3.35	3.8	88.6
Manhattan Island.....					(1)	(3.25)	(3.7)	(87.8)
Long Island.....	(4)	7	12.95	53.1	(5)	3.26	3.73	87.4
Staten Island.....	(2)	6.5	12.65	(51.6)	(3)	3.19	3.84	83
New Jersey (earlier).....	(11)	6.8	12.7	53	(13)	3.38	3.87	87.2
New Jersey (Heye collection).....	(5)	6.9	12.8	54.1	(7)	3.4	3.72	91.7
Virginia (miscellaneous).....					(2)	3.2	3.8	85.6
Virginia (Valentine collection).....	(5)	6.9	13.1	52.4	(6)	3.31	3.72	89

C. EASTERN INDIAN CRANIA: FACE (DETAILS)

MALES

Group	Number of specimens	Nose		Index	Number of specimens	Palate		
		Height	Breadth			Height	Breadth	Index
		cm.	cm.			cm.	cm.	
Southeastern Canada.....	(8)	5.46	2.7	49.1	(4)	5.8	6.8	117.3
Maine.....	(4)	5.1	2.3	45.6	(3)	5.8	6.6	113.8
Massachusetts.....	(10)	5.2	2.6	49.7	(5)	5.75	6.5	113.2
Rhode Island.....	(6)	5	2.65	52.5	(1)	(6)	(7.3)	(121.7)
Connecticut.....	(2)	5	2.45	49				
New York State.....	(15)	5.3	2.75	51.8	(2)	5.95	6.9	116
Manhattan Island.....	(2)	5.9	2.65	44.9	(2)	6.05	6.85	113.2
Long Island.....	(5)	5.3	2.47	46.7				
Staten Island.....	(3)	5.1	2.7	53.1	(2)	5.75	6.7	116.5
New Jersey (Heye collection).....	(7)	5.1	2.6	51.1	(8)	5.6	6.8	120.7
Maryland.....	(1)	(5.4)	(2.7)	(50)				
Virginia (miscellaneous).....	(3)	5.4	2.7	50.6				
Virginia (Valentine collection).....	(9)	5.23	2.74	53.5	(3)	5.9	6.7	114.1

C. EASTERN INDIAN CRANIA: FACE (DETAILS)—Continued

FEMALES

Groups	Nose				Palate			
	Number of specimens	Height	Breadth	Index	Number of specimens	Height	Breadth	Index
		cm.	cm.			cm.	cm.	
Southeastern Canada.....	(5)	5	2.67	53.4	(3)	5.3	6.1	115.8
Maine.....	(4)	4.9	2.45	50	(4)	5.6	6.4	113.8
Massachusetts.....	(21)	4.97	2.46	49.5	(8)	5.5	6.4	115.4
Rhode Island.....	(5)	5.14	2.68	52.1	(3)	5.6	6.5	116.1
Connecticut.....	(2)	4.75	2.6	54.7				
New York State.....	(13)	5	2.67	53.2	(1)	(5.5)	(7)	(127.3)
Long Island.....	(5)	4.9	2.3	49				
Staten Island.....	(3)	4.75	2.58	54.4				
New Jersey (earlier).....	(13)	4.87	2.5	51.5	(2)	5.2	6.3	121.2
New Jersey (Heye collection).....	(9)	4.98	2.63	52.9	(5)	5.25	6.35	120.5
Virginia (miscellaneous).....	(1)	(5)	(2.6)	(52)				
Virginia (Valentine collection).....	(6)	5	2.72	54.3	(5)	5.5	6.4	116.4

CI. EASTERN INDIAN CRANIA: FACE (DETAILS)

MALES

Group	Number of specimens	Diameter frontal minimum	Number of specimens	Basion-prosthion	Basion subnasal point	Basion nasion	Angle of facial prognathism	Angle of alveolar prognathism
		cm.		cm.	cm.	cm.	°	°
Southeastern Canada.....	(14)	9.7	(5)	10.6	9.3	10.7	72	53
Maine.....	(6)	9.35	(1)	(10.4)	(9.1)	10.8	(75)	(55)
Massachusetts.....	(12)	9.5	(5)	10.4	9.2	10.7	73	58
Rhode Island.....	(6)	9.6	(3)	10.5	9.1	10.3	69	58.5
Connecticut.....	(4)	9.1	(2)			10.3		
New York State.....	(16)	9.5	(8)	10.5	9.4	10.6	71	54
Manhattan Island.....	(2)	9.5	(1)	(11)	(10.2)	11.2	(72.5)	(64)
Long Island.....	(1)	(9.3)	(4)	10.3	9.5	10.8	74	64
Staten Island.....	(2)	9.2	(3)	10.7	9.8	11.2	76	62
New Jersey (Heye collection).....	(8)	9.4	(6)	9.9	9	10.3	73	59
Maryland.....	(2)	9.9				(10.8)		
Virginia (miscellaneous).....	(12)	9.5	(1)	(10.2)	9.6	10.6	(74)	(60)
Virginia (Valentine collection).....	(14)	9.7	(1)	(10.2)	9.2	10.6	(71)	(54)

CI. EASTERN INDIAN CRANIA: FACE (DETAILS)—Continued

FEMALES

Group	Number of specimens	Diameter frontal minimum	Number of specimens	Basion prosthion	Basion sub-nasal point	Basion nasion	Angle of facial prognathism	Angle of alveolar prognathism
		cm.		cm.	cm.	cm.	°	°
Southeastern Canada.....	(4)	9.2	(3)	9.6	8.9	9.9	72	56
Maine.....	(6)	9.3	(3)	9.9	9.1	10.2	72	57
Massachusetts.....	(23)	9	(10)	10.1	9	10	71	56.5
Rhode Island.....	(4)	9.4	(2)	10.1	8.7	10.2	73	50
Connecticut.....	(3)	8.9	(2)	10.2	(8.5)	9.8	68	(51)
New York State.....	(13)	8.95	(11)	9.9	9	10.1	72.5	57.5
Long Island.....	(5)	9	(3)	10	(9)	10	71	(59)
Staten Island.....	(3)	9.2	(1)	(9.2)	(8.8)	9.9	(75)	-----
New Jersey (earlier).....	(7)	9.2	(4)	9.8	8.7	9.9	70	54
New Jersey (Heye collection).....	(9)	9	(5)	9.6	8.6	10	74	57
Maryland.....	(3)	9.1	-----	-----	-----	(10.1)	-----	-----
Virginia (miscellaneous)....	(6)	9.1	-----	-----	(9.4)	(10.3)	-----	-----
Virginia (Valentine collection).....	(18)	9.2	(5)	9.9	8.9	10.25	74	56

APPENDIX

One of the most important conclusions reached in connection with the studies dealt with in these pages is that of the physical identity of the Iroquois with the eastern Algonquian tribes. To test this conclusion the writer subsequently examined the valuable collection of Iroquois skeletal material in possession of the Buffalo Society of Natural Sciences,¹ consisting of 34 male and 22 female adult skulls, well identified and in good condition. The results of this additional study are given in the following tables and need little comment except that the conclusions presented in the body of this report as to the physical identity of the Iroquois and eastern Algonquian peoples are fully verified. In every respect the measurements and indexes of the new series fit closely among those of the other Eastern tribes, and in not a single feature do they drop out of line or even equal the extremes of variation in the skeletal remains of the tribes previously studied. In view of these facts the essential identity of the physical characters of the Iroquois and Algonquians, as determined by their skeletal remains, may, it seems, be regarded as definitely established.

IROQUOIS AND MOST NEARLY RELATED EASTERN INDIAN CRANIA

CRANIAL INDEX					
<i>Male</i>			<i>Female</i>		
Connecticut	(4).....	72.4	Connecticut	(4).....	74.6
Maine	(6).....	72.7	Maine	(6).....	74.7
Massachusetts	(14).....	72.8	Massachusetts	(25).....	74.7
<i>Iroquois</i>	(34).....	73.1	<i>Iroquois</i>	(22).....	74.0
Southeastern Canada	(14).....	73.4	Southeastern Canada		
New York State	(19).....	73.5	New York State	(15).....	74.8
Maryland	(4).....	73.6	Maryland	(1).....	74.0
Rhode Island	(6).....	73.7	Long Island	(5).....	74.3
Delaware	(1).....	73.7	Delaware		
New Jersey (Munsee)	(4).....	73.9	Lenape	(19).....	75.1

HEIGHT-LENGTH INDEX					
<i>Male</i>			<i>Female</i>		
Southeastern Canada	(14).....	73.1	Southeastern Canada	(5).....	75.7
Massachusetts	(12).....	73.5	Massachusetts	(24).....	75.5
Connecticut	(2).....	73.5	Connecticut	(3).....	74.9
New York State	(17).....	73.6	New York State	(14).....	72.5
<i>Iroquois</i>	(32).....	74.0	<i>Iroquois</i>	(21).....	74.4
Rhode Island	(6).....	74.1	Rhode Island		
New Jersey	(7).....	74.2	New Jersey	(20).....	74.4
Long Island	(5).....	74.9	Long Island	(5).....	73.2
Staten Island	(4).....	75.2	Staten Island	(3).....	73.9

¹ Grateful acknowledgment for courtesies in this connection are extended to Mr. Henry R. Howland, superintendent of the museum of this Society.

HEIGHT-BREADTH INDEX

<i>Male</i>			<i>Female</i>		
Southeastern Canada	(14).....	99.7	Southeastern Canada	(5).....	98.3
Connecticut	(2).....	100.4	Connecticut	(3).....	98.8
Rhode Island	(6).....	100.5	Rhode Island	(4).....	100.2
<i>Iroquois</i>	(32).....	101.0	<i>Iroquois</i>	(21).....	100.5
Massachusetts	(12).....	101.0	Massachusetts	(22).....	100.9
New Jersey (earlier)	(3).....	101.2	New Jersey (earlier)	(14).....	97.0
Virginia (all)	(17).....	101.8	Virginia (all)	(15).....	99.2

HEIGHT INDEX

(Hrdlčka)

 $\frac{(H+B)+2}{L}$

<i>Male</i>			<i>Female</i>		
Maine	(6).....	72.3	Maine	(5).....	74.1
Long Island	(5).....	72.8	Long Island	(5).....	74.1
Connecticut	(2).....	73.0	Connecticut	(3).....	74.7
Massachusetts	(12).....	73.2	Massachusetts	(22).....	75.1
Southeastern Canada	(14).....	73.3	Southeastern Canada	(5).....	76.3
Manhattan Island	(2).....	73.4	Manhattan Island	(1).....	73.7
Staten Island	(4).....	73.5	Staten Island	(3).....	74.6
New York State	(17).....	73.6	New York State	(14).....	73.7
<i>Iroquois</i>	(32).....	73.6	<i>Iroquois</i>	(21).....	74.2
Delaware	(1).....	73.7	Delaware	.....	.....
Rhode Island	(6).....	73.9	Rhode Island	(4).....	76.1
New Jersey (all)	(17).....	74.3	New Jersey (all)	(20).....	74.8

CRANIAL MODULE

<i>Male</i>			<i>Female</i>		
Rhode Island	(6).....	15.22	Rhode Island	(4).....	14.84
New Jersey (miscel.)	(4).....	15.33	New Jersey	(14).....	14.64
<i>Iroquois</i>	(32).....	15.41	<i>Iroquois</i>	(21).....	14.80
New Jersey (Munsee)	(7).....	15.44	New Jersey	(9).....	14.75
Virginia (Valentine coll.)	(11).....	15.46	Virginia (Valentine coll.)	(13).....	15.00
Southeastern Canada	(14).....	15.48	Southeastern Canada	(5).....	14.77
Maine	(6).....	15.55	Maine	(5).....	14.92
Connecticut	(2).....	15.55	Connecticut	(3).....	14.84
Massachusetts	(12).....	15.56	Massachusetts	(22).....	14.72

FACE: NASION-PROSTHION HEIGHT

<i>Male</i>			<i>Female</i>		
Massachusetts	(8).....	7.4	Massachusetts	(15).....	7.0
Rhode Island	(3).....	7.4	Rhode Island	(4).....	7.1
New York State	(10).....	7.4	New York State	(11).....	6.9
Staten Island	(3).....	7.45	Staten Island	(2).....	6.5
<i>Iroquois</i>	(22).....	7.45	<i>Iroquois</i>	(17).....	7.0
Virginia (miscel.)	(2).....	7.5	Virginia (miscel.)	.....	.....
Long Island	(4).....	7.5	Long Island	(4).....	7.0
Southeastern Canada	(7).....	7.8	Southeastern Canada	(5).....	6.75

DIAMETER BIZYGOMATIC MAXIMUM

<i>Male</i>			<i>Female</i>		
Rhode Island	(6).....	13.35	Rhode Island	(3).....	13.0
Maine	(2).....	13.45	Maine	(4).....	12.95
Massachusetts	(7).....	13.7	Massachusetts	(8).....	12.7
<i>Iroquois</i>	(24).....	13.75	<i>Iroquois</i>	(17).....	12.9
Connecticut	(2).....	13.8	Connecticut	.....	.....
Long Island	(4).....	13.85	Long Island	(4).....	12.95
Virginia (Valentine coll.)	(4).....	13.85	Virginia (Valentine coll.)	(6).....	13.1

ORBITAL INDEX

<i>Male</i>			<i>Female</i>		
Maine	(4).....	86.2	Maine	(4).....	86.2
Massachusetts	(10).....	86.3	Massachusetts	(21).....	88.8
New York State	(16).....	86.8	New York State	(13).....	88.6
<i>Iroquois</i>	(27).....	87.0	<i>Iroquois</i>	(17).....	88.5
Manhattan Island	(2).....	87.4	Manhattan Island	(1).....	87.8
Staten Island	(3).....	87.6	Staten Island	(3).....	83.0
Southeastern Canada	(10).....	87.8	Southeastern Canada	(5).....	89.5
Virginia (Valentine coll.)	(10).....	87.9	Virginia (Valentine coll.)	(6).....	89.0

NASAL INDEX

<i>Male</i>			<i>Female</i>		
Massachusetts	(10).....	49.7	Massachusetts	(20).....	49.5
Virginia (miscel.)	(3).....	50.6	Virginia (miscel.)	(1).....	52.0
New Jersey (Munsee)	(7).....	51.1	New Jersey (Munsee)	(9).....	52.9
<i>Iroquois</i>	(26).....	51.7	<i>Iroquois</i>	(17).....	51.9
New York State	(15).....	51.8	New York State	(13).....	53.2
Rhode Island	(6).....	52.5	Rhode Island	(5).....	52.1
Staten Island	(3).....	53.1	Staten Island	(3).....	54.4

DENTAL ARCH ("PALATAL") INDEX

<i>Male</i>			<i>Female</i>		
Virginia (Valentine coll.)	(3).....	114.1	Virginia (Valentine coll.)	(5).....	116.4
New York State	(2).....	116.0	New York State	.....	.....
<i>Iroquois</i>	(14).....	116.2	<i>Iroquois</i>	(15).....	114.3
Staten Island	(2).....	116.5	Staten Island	.....	.....
Southeastern Canada	(4).....	117.3	Southeastern Canada	(3).....	115.8

ANGLE OF FACIAL PROGNATHISM

<i>Male</i>			<i>Female</i>		
Rhode Island	(3).....	69°	Rhode Island	(2).....	73°
New York State	(7).....	71	New York State	(10).....	72.5
<i>Iroquois</i>	(17).....	72	<i>Iroquois</i>	(15).....	72
Massachusetts	(4).....	73	Massachusetts	(3).....	71
Long Island	(4).....	74	Long Island	(3).....	71

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The preceding statements must not, of course, be regarded as implying any lessening of our interest in the Iroquois group. This large and important body of Indians was a complex of tribes, some of which, as yet, are represented but poorly in our collections, so far as their skeletal remains are concerned. It is possible that more abundant material will exhibit some differences between these tribes, owing to their varied earlier associations and perhaps to other agencies. In any event, the Iroquois are well worthy of further study, even though there may not be strong probability that the chief conclusion reached in this work, namely, their close physical relation with the Algonquians, can be seriously modified.

Much also remains to be done with respect to the Algonquians. The Canadian tribes have scarcely been touched as yet; there are numerous gaps in the skeletal collections from our Eastern states; and data on skeletal parts other than the skull in the principal tribes are very deficient.



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**EXPLORATION OF
A MUNSEE CEMETERY NEAR
MONTAGUE, NEW JERSEY**

**BY
GEORGE G. HEYE
AND
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